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INHERITANCE OF "MONGOLIAN" DEFICIENCY.

A common type of feeble-mindedness shows external indications by a type of feature which is called "mongoloid," because of a certain resemblance to that of some of the Mongolian races. The woman at the left has this appearance, yet the tests showed that she was normal mentally. She was admitted as an immigrant, and by a normal husband gave birth to the child at the right, which not only had the mongolian characteristics exaggerated, but was a pronounced imbecile. The child was deportable, and the mother of course went with him. There is nothing in the immigration laws at present to prevent the entry of such women as these, if they themselves can pass the mental tests, although it is evident from many such cases as this, that they transmit feeble-mindedness to their offspring, even though they themselves may seem to be normal. (Frontispiece.)
(See page 122.)

PURE LINES AND SELECTION

Practical Idea of Stock Breeder and Theoretical Ideal of Biologist Differ—Evidence Advanced in Support of "Pure Lines" Inadequate—Variation in Asexual Reproduction—Experience With Hooded Rats Shows Selection Possible in Either Direction.

W. E. CASTLE,
Professor of Zoology in Harvard University and Research Associate of the Carnegie Institution of Washington.

CURRENT discussions among students of heredity about pure lines of animals and plants are likely to be very perplexing to those breeders of live-stock who pride themselves upon the excellence and purity to breed-standards of the animals which they keep. "Selection within the pure line," we are told by the biologist, "is without effect." But selection is the foundation principle of the stock breeder and a statement addressed to him that selection is useless in the breeding of any sort of domesticated animal, however pure, would be received with incredulity.

It may be worth while therefore to point out that the biologist, as quoted above, and the stock breeder are talking about very different things when they speak of "pure lines." The stock breeder has in mind a race of animals bred as closely as possible to a recognized standard. But he realizes that some individuals conform more closely than others to the standard of the breed, and his experience indicates that continual selection of the "some" rather than the "others" is essential to maintain the purity of the breed. He understands the biologist's dictum that "selection within the pure line is without effect" to mean that one animal is as good as another to breed from provided both belong to the same pure race, and his comment is "Nonsense", and he is quite right too.

But that is not the biologist's meaning. The biologist's "pure line" is an imaginary thing. I doubt very much whether it was ever realized in any actual race of animals or plants. It has no more relation to actual animals and plants than a mathematical circle has to the circles described by the most accomplished draftsman. All the circles of the draftsman have wiggles in them, if you look at them carefully enough; only the mathematician's imaginary circle is perfect. Now the biologist undertakes to be the mathematician of breeding and to construct an "exact" system of heredity in which the "pure line" concept holds a conspicuous place. He reasons thus: Individuals of the same parentage differ for two reasons, (1) because of inherited differences and (2) because of differences in environment. If differences of environment (soil and situation of plants, care and food of animals) could be altogether eliminated, then animals of the same heredity should be identical, and should produce only offspring like themselves. They would constitute a *pure line*.

THE BIOLOGIST'S REASONING.

The biologist reasons further: Although it is impossible to control the environment completely and thus make it uniform and so eliminate its effects upon variation, nevertheless the effects of environment are not *inherited*. Consequently, if two germ-cells could be brought together in fertilization to form an individual, each of which germ-cells was identical with the other in its heredity, a *pure individual* would result, so far as heredity is concerned, all of whose germ-cells would transmit the same inherited characteristics, and all would look alike except as they were

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made to vary by the environment. But as the effects of environment are by hypothesis not inherited, all would breed alike regardless of their appearance, hence it would be useless to make any choice among them.

The pure line theory, as outlined above, like the theorems of the geometer, rests upon the validity of certain postulates, any one of which being disproved, the whole argument fails.

The pure line postulates are: (1) *The effects of environment are not inherited;* (2) *inherited characteristics do not vary.* The first of these postulates is a bone of unending contention among biologists, and the last word has not been said upon it yet. Practical breeders believe that good care and feeding are not wasted upon their stock, that not only the individuals so treated are benefited but subsequent generations also. It must be admitted, however, that the evidence is not satisfactory that subsequent generations are given a better endowment by better treatment of the present generation. What is inherited is capacity to utilize opportunities of the environment. It is doubtful whether utilization of the environment by one generation increases the capacity of the next generation so to utilize it, though we all optimistically hope for this outcome. Plant breeders have shown that plump, well-nourished seed produces more vigorous plants and larger harvests than shrunken ill-nourished seed, a seeming inheritance of environmental effects. But in reality the seed is only part embryo; part of it is food stuff, environment of the previous generation carried over bodily to form the early environment of the new generation. So that when we select well nourished seed we select, not only a bundle of inherited plant qualities, but also a good initial environment for the plant. On the whole the first postulate of the pure line theory stands, if not proved, at least *not disproved.*

The second postulate of the pure line theory is a much shakier one, but I must hasten to qualify the form in which it has been stated before it is disowned by all supporters of the theory. The Hagedoorns, who have championed the theory in *The American Breeders' Magazine* (Vol. 4, No. 3), are careful to say that inherited "factors, not characters", are constant. What they mean, I take it, is this. An animal has some visible character, such as black fur. The black color of this fur may, however, result from several independent physiological processes, or agencies, no one of which by itself produces a visible effect. These agencies, known or unknown, are *factors* in producing a black coat. Some of them may be inherited, others environmental. Although the blackness of the coat may vary (owing to variation in environmental factors) *its ultimate inherited factors do not vary.*

EXPERIENCE WITH MENDELISM.

What evidence is there for the idea that the ultimate factors of inheritance do not vary? First let us inquire how the idea originated. Ten years ago, when the rediscovered Mendel's law was new, it was supposed that characters which conformed with Mendel's law did not vary. They behaved as units in heredity; how could they vary; how could units vary? The gametes were "pure". Each one either contained or did not contain a particular Mendelian unit. Units could not be split or modified. This idea found its fullest development in Punnett's *Mendelism.*[1] Later investigations have shown beyond question that Mendelian characters do vary. Practically everyone has now abandoned the idea of "*gametic purity*", but the idea of purity has been shifted from the characters which can be seen to vary, to *factors* which may be imagined to be invariable, though they can not be seen.

We might at this point with propriety end the discussion concluding that factors which are imaginary, like the circles of the mathematician, are of necessity perfect and constant. This is practically the burden of East's argument in *The American Naturalist*[2]. But as the world has benefited by the speculations of the geometers, so, let us hope, it may profit by the speculations

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[1]The Macmillan Co., N. Y., 1911.

[2]Vol. 46, No. 551, Nov. 1912.

of the biologist, especially if some means can be devised to test their validity by experiment.

Since the supposed "factors" of inheritance are invisible, we can not hope to deal with them directly by experiment, but only indirectly. Our method obviously should be to eliminate all environmental factors so far as possible and also all factors of inheritance except one. If then this one being present gives a uniform result and being absent gives a result also uniform but different, we can conclude the factor constant. But it is very difficult to apply this method to specific cases, since when variation is observed it is always possible to suppose that all factors but one have not yet been eliminated.

From existing experimental work what evidence have we for the idea of factorial constancy? Perhaps Johannsen[3] has contributed more than any other one person toward popularizing the idea of factorial constancy. Selecting size variations in bean seeds, he was sometimes successful in modifying the racial mean, sometimes unsuccessful. Whenever he was successful, he attributes the success to variation in genetic factors; whenever unsuccessful he assumes that no variation in genetic factors occurred, i.e., that a *pure line* had been established, which could not subsequently vary unless hybridization occurred out of the race or a mutation occurred within it. It would be of much interest to know whether Johannsen's pure lines were as pure for all other characters as for size of seed and equally unresponsive to selection in all particulars of leaf and stem. For the bearing of his observations on seed size upon the question of the constancy of Mendelizing characters is not very obvious, since seed size does not Mendelize.

NO CLEAR-CUT DEMONSTRATION.

Although extensive observations upon the subject of size inheritance in both animals and plants have been made, they have resulted in the demonstration as yet of no single clear-cut Mendelizing unit character (or factor either). Dwarf plants, known to Mendelize when crossed with tall ones, form only an apparent exception; in reality they differ in *habit* rather than in size from tall ones.

The results of all observers, as regards the inheritance of ordinary differences in size, are closely in accord. When two races differing in size are crossed, the immediate offspring are intermediate in size. The next generation of offspring is likewise intermediate but more variable as a rule, and it has been found possible in some cases to select from them forms as extreme in size as the original parents. To interpret such cases as Mendelian requires the assumption that no single unit or factor is concerned in the size difference, but many wholly independent units. For a single Mendelizing unit would produce a wholly different result. But suppose we allow the assumption that many independent Mendelizing units or factors are concerned in the inheritance of size. The pure line hypothesis is not benefited by this assumption, unless we suppose further that these hypothetical factors do not vary. But this is an assumption wholly without warrant. For in all cases studied critically with reference to the constancy of characters demonstrably Mendelian, the characters have been found to be *inconstant* and subject to modification by selection. What ground is there, then, for supposing that in a case where no factors are demonstrable, such factors are *invariable?* This is like supposing that the moon is made of cheese and that further this cheese is *green*. The speculation is harmless, if one chooses to amuse himself that way, but it can scarcely be called a valid scientific conclusion.

Aside from the size selection experiments of Johannsen, which were made on a self-fertilizing plant, the experiments of Jennings[4] are most often cited in support of the view that selection within the pure line is without effect. In some respects the material used by Jennings was even more favorable than that of Johannsen. It consisted of a

[3]Elemente der exakten Erblichkeitslehre, Jena, 1909.
[4]Am. Naturalist, Vol. 43, No. 510, June 1909.

species of small animal (paramecium) which ordinarily multiplies by dividing into two parts, each of which becomes an entire individual. Only at rare intervals does it reproduce by a method comparable with sexual reproduction in the higher animals and plants. If variation in genetic factors arises only from sexual reproduction, then asexually produced lines of paramecium should be devoid of genetic variation and so unaffected by selection. Jennings believed this to be true. He regarded the asexually produced descendants of a single paramecium as constituting a *pure line*, which selection could not change, and recognized several different pure lines isolated from his mixed cultures, each varying about a different average of size. Within each pure line he found selection ineffective.

IN ASEXUAL REPRODUCTION.

But considerable doubt is raised concerning the soundness of these conclusions by the subsequent work of Calkins and Gregory[5] who find that from a single "pure line" as defined by Jennings subordinate lines may be isolated which differ in mean size from each other more than the pure lines which Jennings supposed to be genetically different. If this is so, it must be possible for genetic differences to arise *in the course of asexual reproduction*, which on the pure line hypothesis is impossible; and if such genetic differences do arise, they afford material for selection to act upon with effectiveness, even within the supposed pure line.

Further evidence that racial differences may originate within an asexually produced and so genetically "pure line" is afforded by horticultural varieties of plants propagated asexually. Examples are found among apples and potatoes. An orchard variety which has endured for any considerable length of time is apt to develop sub-varieties. The same is true of varieties of potato which have enjoyed wide and long continued popularity. The *Williams* apple, widely cultivated in the eastern United States, occurs in two distinct strains, one conspicuously striped, the other nearly solid red. The *Baldwin* apple which has been in cultivation for over a century has developed sub-varieties differing in shape. The *Early Rose* potato, formerly the favorite early variety in the United States, developed sub-varieties, some of which were more elongated in shape than others.

So common are changes of this sort within asexually propagated varieties that botanists have given them a special name, that of *bud variations*. East, from his studies of bud variation among potatoes, concluded them to be ordinarily *loss* variations, or retrogressive variations due to the loss of some normal racial character, as are most of the germinal variations which arise as sports in the course of sexual reproduction among domesticated animals and cultivated plants. If so, we are led to conclude not only that variations may occur within a "pure line" asexually produced, but also that these variations are of the same nature as those which arise in the course of sexual reproduction. There can be no question of the effectiveness of selection in either category of cases.

The Hagedoorns think that evidence in favor of the pure line hypothesis is afforded by Vilmorin's varieties of wheat bred each from a single plant. They figure four heads of wheat selected each as typical of those produced by the ancestral plant 50 years ago, from which a pure variety has descended. Beside these they figure a typical head of each of the derived varieties at the present time. A strong resemblance exists in each case between the head of 50 years ago and the present day representative of the same variety, though this of course does not amount to identity. We are, however, told that "As can easily be seen from the photograph, all these generations of selection have not changed any one of the varieties one little bit."

EVIDENCE NOT COMPLETE.

The photographs afford a rather small basis for so sweeping a conclusion. We are not shown the entire plant of 50 years ago beside that of today; we know

[5]Journal of Experimental Zoology, Vol. 15, No. 4, Nov. 1913.

nothing about the appearance of its leaves, stem, or root; we know nothing of its physiological behavior under controlled environment; yet we are asked to believe the two plants, of 50 years ago and of today, *identical in genetic character*, because a selected head of one can be roughly matched with a selected head of the other. Does this prove that selection is without effect? Rather it proves that wheat can be selected to a type. What evidence have we that any attempt has been made in these 50 years to *change* the type? Not once, I venture, has the shortest headed plant been chosen in the long headed variety, or the *least* branched head in the branched headed variety. Yet on the pure line hypothesis, this would have made no difference in the result. How do we know that it would have made no difference, the experiment not having been made? Doubtless the pure line advocate would reply, because selection in the opposite direction has effected no change, the long headed race being now no longer and the branched headed race no branchier. But this assertion is not established by the photographs of matched heads, and even granting its correctness, it might well be that a physiological limitation had been reached 50 years ago which it has not been since possible to remove. When selection has attained the ultimate, it can go no farther. If I select animals spotted with white for increasing blackness and obtain an animal black all over, the task is accomplished. Nothing more can be done *in that direction*. This does not prove selection to increase or to decrease the white spots of animals to be ineffectual; indeed, the contrary has been fully established.

The Hagedoorns think further to strengthen the argument for the pure line theory by a challenge to its opponents to modify a character within a narrowly inbred line of animals by selection and then to bring the character back again to its original condition. "For," they say, "it is obvious that it may be possible by selection to get rid of such genetic factors as influence the character selected in a direction opposite to that in which we want to modify it, and thus to make great progress. On the contrary, if selection really might change genetic factors, modification of any character would be as easy in one direction as in the other." This test (in all essential features) has been applied repeatedly in a series of selection experiments with the hooded pattern of spotted rats (a Mendelizing unit-character) described in *Publication No. 195 of the Carnegie Institution of Washington*.[6] The experiments show that plus selection and minus selection are both effective, and that selection away from and back to any modal condition of the pattern are equally easy of accomplishment.

If I were disposed to use challenges for argument, I would make a counter challenge in these words—Let him who thinks selection ineffectual try it on any character of any animal. If he is persistent and critical in his experiments, I am confident that he will be convinced of the effectiveness of selection, as all practical breeders are, and will thenceforth regard "pure lines" as purely imaginary.

[6]A preliminary account of certain of the experiments was given in Am. Breeders' Magazine, Vol. 3, No. 4.

R. H. JOHNSON IS CHAIRMAN

Professor Roswell H. Johnson of the University of Pittsburgh has been appointed chairman of the Eugenics Section of the American Association for the Study and Prevention of Infant Mortality, which will hold its next meeting at Boston in November.

THE JAMES RIVER WALNUT

Probably Cross Between Butternut and English Walnut—Shows Remarkable Vigor, Although Productivity is Slight and Nuts of no Commercial Value—Promising as Bud Stock for Timber—Vigor of Root Stock Increased When Scions of Hybrid are Used.

PETER BISSET,

Office of Foreign Seed and Plant Introduction, Bureau of Plant Industry, United States Department of Agriculture, Washington, D. C.

IN VIRGINIA, between Portsmouth and Richmond, on the south side of the James River, there is located the well-known and historical mansion of colonial days, "Lower Brandon." Across the river, just opposite "Lower Brandon" is "Rowe Farm", another of the old Virginia estates dating back to colonial days. On Rowe Farm there is growing one of the most remarkable walnut trees of which there is any record in this country.

The tree is of gigantic proportions, reaching a height of 100 feet, with its head, or crown of branches, towering above all other trees in the neighborhood. Its spread of branches was formerly 134 feet, but during a recent storm a large branch was broken off reducing its present spread of branches to 123 feet. At four feet from the ground the trunk of this tree measures 31 feet three inches in circumference, and at six feet from the gound, over 25 feet in circumference. At 12 feet from the ground the trunk divides into four large branches, three of which are larger than any tree in the neighborhood.

No one can tell how old this remarkable tree is, and there is no record to indicate its age. I am, however, informed that the old farm house on this place was built about 200 years ago and the supposition is that the seed or young tree from which this tree has developed, was planted at the same time. The size of the tree would lead one to believe that it is from 150 to 200 years old, and it also shows that the tree is of extraordinarily rapid growth, which is no doubt due to its hybrid origin, for if its rate of growth were the same as that of our native walnut, it would have had to be planted before the settlement of Jamestown—1607—in order to have attained its present size.

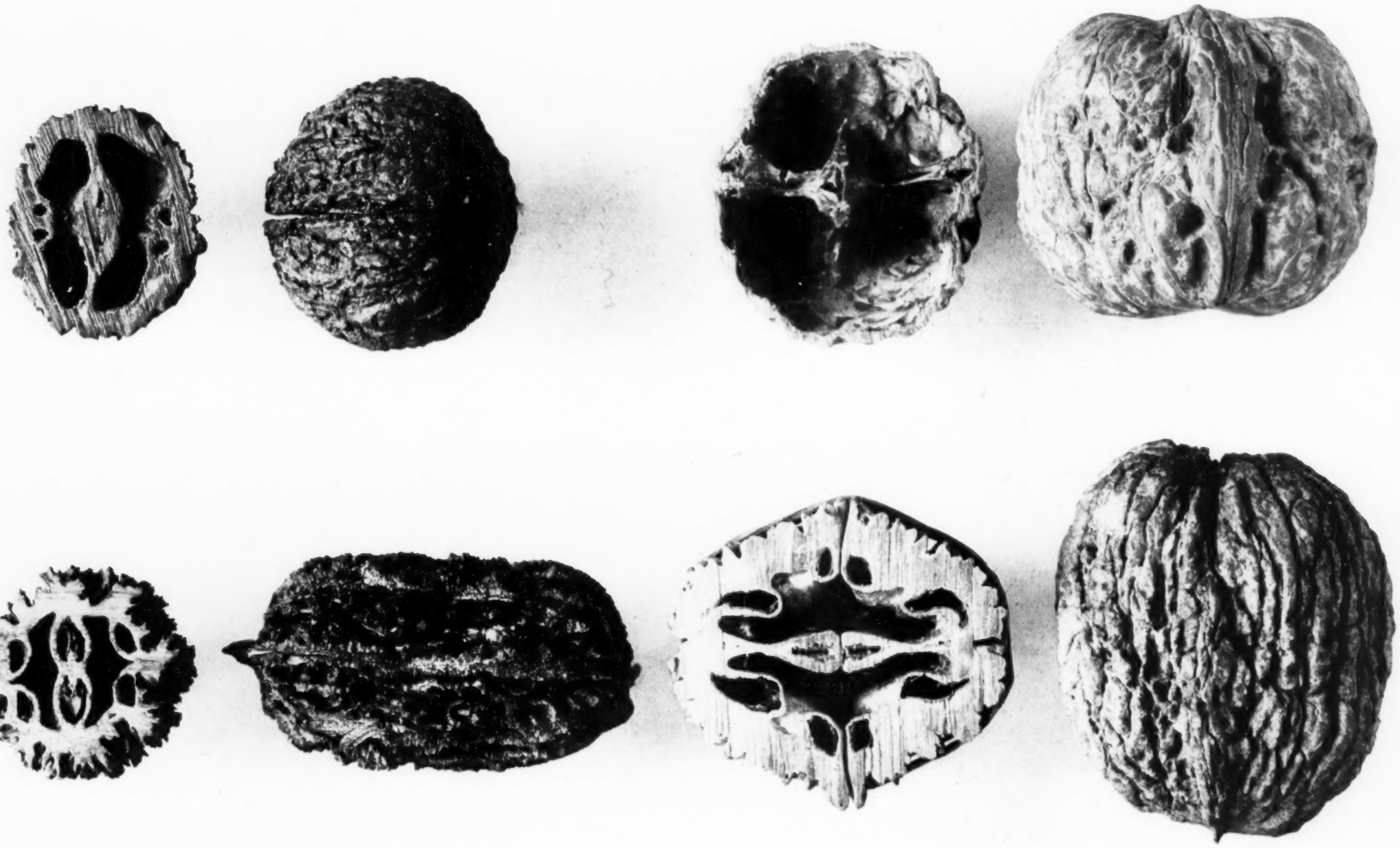
I believe this tree to be a hybrid between our native butternut walnut (*Juglans cineria*) and the Persian, or so-called English, walnut (*Juglans regia*). The outer pericarp, or husk, of the fruit resembles our common black walnut (*Juglans nigra*). The nut also, in many respects, resembles *Juglans nigra*, but it is of larger size and of elongated shape. The habit of the tree, the growth of the branches, the bark and the leaves, which are composed of from five to seven pairs of leaflets, their shape, entire margins and veining, would indicate a very close relationship to the Persian Walnut (*Juglans regia*). The kernel of the nut is so small that it is not considered of any value for home use, and it certainly is of no commercial value as an edible nut.

Prof. C. S. Sargent, of the Arnold Arboretum, Jamaica Plains, Mass., who has seen trees similar to this one, is inclined to believe it to be a hybrid between regia and nigra. I, however, am lead to believe that it is a hybrid between regia and cineria for the following reasons:

The leaves of the hybrid have little pubescent hairs at the base of and along the veins of the leaflets that are entirely lacking in any other species I know of. The shape of the nut is more like cineria than nigra, and upon examining a cross-

THE JAMES RIVER WALNUT TREE.

Professor C. S. Sargent of the Arnold Arboretum, Boston, called this the most remarkable tree in the eastern United States. Vigor is its most marked characteristic—note its size in comparison with the horse and buggy underneath. There is good reason to believe that it is a hybrid, and Mr. Bisset finds strong evidence to show that it is a cross between the common butternut and the Persian or so-called English Walnut. (Figure 1.)



Black Walnut (*J. nigra*)
Butternut (*J. cinerea*)

Persian Walnut (*J. regia*)
James River Hybrid Nut

THE HYBRID AND ITS POSSIBLE PARENTS.

Merely from an inspection of the product, one is quite ready to admit that the Persian or English Walnut was one of its parents. The appearance of the nut itself does not give any safe indication as to whether the other parent was the black walnut or the closely allied butternut; but by a comparison of the leaves, and of the pubescence of bud-sticks, Mr. Bisset decides in favor of the latter. Second generation trees are now being grown, and as soon as they begin to bear, the problem should be settled beyond dispute. (Figure 2.)

section of the nut it appears as if the many fine lines, or divisions, of cineria had become solidified in the nut of the hybrid, thus causing the thick, hard shell of the seedling.

There is a young walnut tree growing a short distance from the old one (not over 150 yards away), which is said to have been raised from a seed borne by the old tree and planted about 1860. This is about the same height as the parent tree, and has a trunk about two and one-half feet in diameter. Its habit of growth, leaves, trunk, and bark are similar in every respect to that of the parent tree, with the single exception that the young twigs are heavily covered with pubescent hairs, which it would seem to have inherited from the butternut parent (*Juglans cineria.*)

Neither of the trees are prolific bearers, and what nuts they do bear seem to be of extremely low vitality, as so far we have not been able to learn of any other seedling trees being grown from them. The low vitality of the seeds indicates a weakness that is not at all uncommon in hybrids.

Professor Asa Gray was at one time shown young fruits from the old walnut tree, which he at once identified as *Juglans cineria;* the shape of the nuts being elongated and sharp-pointed, as in that species; but much wider or thicker. It is but just, however, to say that no leaves accompanied the specimen sent Professor Gray, to help him in his identification.

There is one character in the leaves of the old tree that resembles nigra, namely, that the leaflets have the sickle-like form of that species. Notwithstanding this leaflet resemblance however, and taking into consideration all of the characteristics of the old tree, and specially those of the young one (which, I think, we may be permitted to call the second generation) the shoots or young twigs of which have reverted to, or developed, the pubescent hairs of cineria, I believe this walnut to be a cross between regia and cineria, as before stated.

Now as to the value of this tree and similar hybrids, many have feared that, owing to their rapidity of growth, there would be danger of the scion overlapping the stock, and a poor growth be obtained as a result. Experiments being carried on at the present time in California, in grafting hybrid walnuts on the native California Black, have shown that the scion of the hybrid stimulates the stock itself to a more rapid growth and, therefore, we may find that the rapidity of growth of the hybrids will present no difficulties to the successful propagation and utilization of these hybrids for lumber production.

The soil upon which these two trees are growing is an alluvial, rich, sandy loam, of great depth, a soil well suited to the best development of the walnut tree.

In spite of this evidence, some of my friends are inclined to doubt the hybrid origin of this tree and to think it probably an aberrant form of the English walnut, as it is a well known fact that this species presents many variations or forms which yield nuts with all kinds of shells varying from that of the paper-shell variety, that can be easily crushed between the fingers, to the hard, thick-shelled varieties that are used so extensively in Germany and Switzerland in making small toys—the toys being carved out of these nuts. If the nuts borne by this tree were of greater vitality we would soon be able to determine without a doubt the parentage of the tree, for the young seedlings would show in their leaf characters the usual variation of seedlings from hybrids, but owing to this low vitality of the seed, it will, I am afraid, be some time before we can definitely decide upon the parentage of the tree.

MARRIAGE SELECTION

Contribution of Superior People to the Race Much Diminished by Present Educational System—Men Must be Made Independent Earlier and Women's Colleges Made Co-educational—Motherhood Should Receive Greater Honor and Cynical Sex Teachings Be Avoided.

ROSWELL HILL JOHNSON,
Professor of Biology and Geology, University of Pittsburgh, Pittsburgh, Pa.

THE great principle of natural selection still furnishes the chief motive power of evolution, even though nowadays we believe the lines are largely determined by the nature of the variations which appear. Now, in the study of human evolution at least, it becomes necessary to distinguish three distinct kinds of natural selection, for our social agencies affect these three kinds differently. These are lethal selection—that which operates by differential mortality; sexual selection—that which operates by differential success in mating; and fecundal selection—that which operates by differential fecundity. Today it is sexual selection, differential success in mating, that I am to discuss under this title of Marriage Selection. We may call it marriage selection, inasmuch as the extra-marital relations are largely sterile, for one reason or another, which we need not here analyze.

Sexual selection in man has one sharp distinction from that in the inferior species. In the latter, because of the larger rôle of instinct and the lesser rôle of social regulation and judgment, nearly all the individuals mate. There are very few unmated females and very few unmated males, except in species having severe male combat, when matelessness is the result of defeat. Where combat prevails, the main result of sexual selection is to cause a disparity of size and strength between the sexes and to accentuate bodily weapons, such as horns, canine teeth, spurs, and the like.

Since the disparity of size and strength between the sexes in man is no greater than that in the anthropoid apes, there is no evidence that male combat played a large rôle in the dawn-man. Indeed, the great reduction in the canine teeth indicates that combat has played a smaller rôle as time has passed, and fortunately so.

COULD NOT OPERATE ALONE.

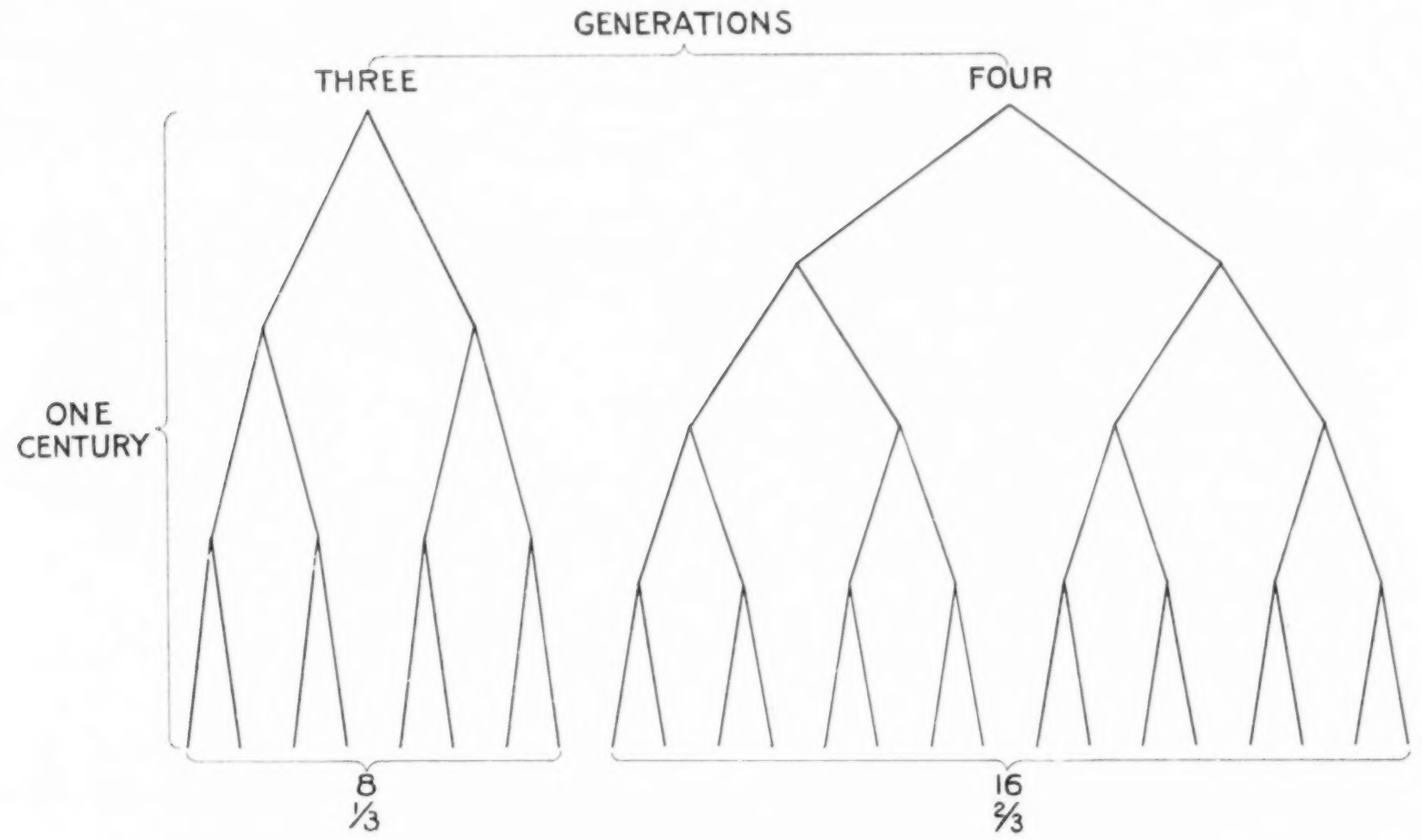
Sexual selection in primitive man, as soon as individual combat was reduced, operated very slightly, if unaided. Its effectiveness depended largely upon the co-operation of lethal and fecundal selection. Thus in warfare, the males of the defeated tribes were frequently killed, and the females taken as additional wives. Or, even when all eventually mated, some, who possessed a specially desirable characteristic to a higher degree, were chosen earlier and thereby had more progeny, or they were chosen by the superior, whose progeny would in some cases inherit a greater viability.

It is very probable that many of our esthetic attributes, such as musical and artistic ability, which are difficult to account for by lethal selection, have been produced by sexual selection.

In modern man we have the contrast of an unprecedented number of unmated individuals. This condition has developed with the growth of romantic love, which is the exclusive preference for a very long period for one mate over all others. As Finck has pointed out, this has been very much accentuated from the time of Petrarch on.

Now if these unmated individuals

Address made before the National Conference on Race Betterment, Battle Creek, Mich., January 12, 1914.



THE EFFECT OF LATE MARRIAGES.

Given a population divided into two equal parts, one of which produces a new generation every 25 years and the other every $33\frac{1}{3}$ years, the diagram shows that the former group will outnumber the latter two to one, at the end of a century. The result illustrated is actually taking place with various groups of the population of the United States. For economic reasons, many superior people are postponing the age of marriage. The diagram shows graphically how they are losing ground, in comparison with other sections of the population which marry only a few years earlier, on the average. It is assumed in the diagram that all persons in the two groups marry, and that each couple produces four children. (Figure 3.)

differ from the others in any important respect, sexual selection is very important. Or if we can alter the percentage of the unmated in different classes, sexual selection may become very potent.

It is obvious that the innately mediocre individuals are most numerous, and that both the markedly superior and inferior by nature are far less common. I mean by superior those who are individually happier and socially more useful than the average. The mental characteristics, at least in such a category, are too complex for a unit character treatment, even if such superiority is built up by unit characteristics.

WHY MEN DO NOT MARRY.

We must consider then what causes the failure to mate and what is the quality of each of these classes. Taking the men we have:

1. The cultivation of a taste for sexual variety and a consequent unwillingness to submit to the restraints of marriage.
2. Infection by venereal disease.
3. Pessimism in regard to women from such experiences.
4. Deficiency in normal sexual feeling or perversion.
5. Deficiency of one kind or another causing difficulty in getting an acceptable mate.

The persons in these five groups are, as a class, inferior. This inferiority is in part innate and in part the result of bad environment. But since innate inferiority is so frequently a large factor, we can conclude that the group as a whole will average innately inferior.

Then there are two other classes, largely superior by nature:

6. Those who seek some other end so ardently that they will not make the necessary sacrifice in money and freedom to marry.
7. Those whose likelihood of early

marriage is reduced by a prolonged education and apprenticeship.

We see that the action of sexual selection in regard to males, while favorable in some ways, is in great need of improvement. Such efforts may be made along three lines.

MEANS OF IMPROVEMENT.

1. Try to lead all young men to avoid a loose sexual life and venereal disease. A general effort will be heeded more by the superior than by the inferior.

2. Hold up the rôle of husband and father as particularly honorable, and proclaim its shirking, without adequate cause, as dishonorable. For a man to say he has never met a girl whom he can love, simply means he has not diligently sought one, or else he has a deficient emotional equipment, for there are many, surprisingly many, estimable, attractive, unmarried women.

3. Cease prolonging the educational period past the early twenties. The professional schools in our country are steadily delaying the age of graduation and thereby that of marriage. They formerly asked for High School training, and many still ask no more. But other schools have demanded more and more, till now one requires a collegiate bachelor's degree for entrance. The situation is made still more serious for medical students by the frequent postgraduate hospital practice without pay. It is time to call a halt. This cannot go on without serious loss to the race. Our young men should not have their marriage postponed by external circumstances past 25 years. This means we must allow students to specialize earlier. If there is need of limiting the number of candidates, let us have competitive entrance examinations. We *must* have our superior men marrying earlier, even at some cost to their early efficiency. The high efficiency of any profession can be more safely kept up by demanding a minimum amount of continuation work in afternoon, evening or seasonal classes, laboratories or clinics. No more graduate fellowships should be established till those now existing carry a stipend adequate for marriage.

WHY WOMEN REMAIN SINGLE.

Now we come to the consideration of sexual selection in women. Are the unmated inferior?

We do find some inferior individuals, such as those unattractive in manner and appearance, wholly as the result of poor health. This may be either inherited or else the result of ignorance frequently due to mental inferiority. Others are unattractive because of the absence of all sex feeling, or of some physical abnormality. And still others are unmated because they have fallen into ways of loose living, some as the direct result of innate defects such as feeble-mindedness, unusual susceptibility to suggestion, or sexual hyperesthesia.

On the other hand, when we have passed these groups of women, we find large groups that are distinctly superior. Some of these have had their chance of marriage reduced by going to women's colleges, others through engaging in preëminently feminine occupations, such as the teaching of children, yielding meagre opportunities to associate with men, or others through living in those cities that have an undue proportion of women. Then there are besides these, superior women who, because they are brought up in families without brothers or brothers' friends, are so unnaturally shy that they are unable to become friendly with men, however much they may care to. There are still others who repel men by a manner of extreme self-repression and coldness, sometimes the result of parents' or teachers' overzealous efforts to inculcate modesty and reserve, things valuable in due degree, but bad in excess.

In order to present to you the seriousness of the situation I attach the results of a study made by my student, Miss Helen D. Murphey. This deals with the graduates of Washington Seminary, in Washington, Pennsylvania, a secondary school for women founded in 1837, greatly antedating the first woman's college which opened in 1865. You will

see[1] that the marriage rate has declined. The drop in the '60s is due to the Civil War. You will also notice that the percentage engaged in occupations other than housewifery has increased progressively. It is not clear which of these occurrences is causal.

BIRTH RATE ALSO LOW.

The ominousneess of this declining marriage rate is aggravated by the low birth rate which these same women are found to contribute. Now combining these results to get the birth rate of the graduates as a whole, we have a most discouraging result.[2] Notice that only the earliest classes, with one or two exceptions, have enough children to reproduce the class. And this is not a college, and is not in New England, but in the same small city as Washington and Jefferson College, a much larger institution for men. If then under these favorable conditions, the marriage rate is so low, and marriage is so late,[3] we may infer that the low rate is widespread.

Let us now examine some of the results thus far attained in a study of Wellesley College data, made by my student, Miss Bertha Stutzmann.

Taking the Wellesley graduates of the classes 1905 to 1912 inclusive, it was found that 19.1 per cent. of them were already married in the fall of 1912, when the facts were collected. But for graduates whose scholarship was sufficiently high to entitle them to membership in the honor society, Phi Beta Kappa, the ratio of marriage to that of those who did not make this society was as 15 to 19. In other words, high scholarship in college women is (in this case at least) not found to be an aid to marriage, while in the normal school girls the opposite was the case.[4] It seems fair to assume that intellectuality in women is normally attractive to men, if these women do not neglect their social opportunities.

We see from this that the Wellesley alumnae have a very low marriage and birth rate. There is only one mitigating circumstance, that these women have married superior men. Out of the last 15 recently reported engagements which I noted, seven are to college or university alumni, although college graduates make up but about 1% of the whole population.

That college women are superior to the average woman is a safe inference. However, we may use another criterion of superiority. Eminence may be measured by space in collective biographies.

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[1]The relation between the decline of the marriage rate and the number of women entering professions is shown by the following figures taken at five year intervals, where A represents the percentage married and B the percentage who have gone into some occupation other than home-making:

	'45	'50	'55	'60	'65	'70	'75	'80	'85	'90	'95	'00
A	78	80	74	75	67	63	72	63	59	56	57	58
B	20	14	13	20	12	14	19	17	30	26	30	39

[2]The figures, summed at periods of five years, are as follows, when A represents the years in which the women graduated, B the total number of graduates, C the total number of their children and D the number of children per graduate:

A	'45	'50	'55	'60	'65	'70	'75	'80	'85	'90	'95	'00
B	46	86	101	98	69	62	43	98	113	100	117	108
C	146	150	152	73	81	70	59	122	130	83	131	75
D	317	175	151	74	118	113	137	124	115	83	112	69

[3]A graph plotted to elucidate this point shows that a large majority of the women marry four or five years after graduation, but the number of those marrying after 10 years is not very much less than that of the girls who become brides in the first or second year after graduation.

[4]In this same tabulation, it was found that the alumnæ of Wellesley College who were members of Phi Beta Kappa had an average of .065 of a child, each, while the rate for the girls who had not attained similar distinction in scholarship was .085.

Miss Castle's figures[5] show a correlation of eminence with a very late age at marriage and a consequent decreased racial contribution.

DELAY IS SERIOUS.

The objection has been made that eugenists are too much disturbed by this late marriage of superior women. To postpone marriage seriously reduces the likelihood of marriage. The critic says that late marrying women will have their children closer together and so eventually have as many. But the facts as collected by Miss Smith do not bear this out. Furthermore, the late marriage of superior persons cuts down their contribution to the race stream, because the years of fertility left to the wife are reduced. (Now that the average of human life is prolonged, the climacteric seems to come on startlingly soon to many of these late married women). Again, late marriages are relatively ineffective because of the lengthened generation. Suppose a generation to be 25 years or 33 1-3 years respectively in two different stocks, and that all persons marry and each couple have four surviving children or two per parent. The result (fig. 3) is that the 25-year stock constitutes two-thirds of the population at the end of a century.

Is it not imperative that something be done to raise the marriage rate of all superior women? To this end we must dissuade superior men from shirking marriage. If these superior men would keep their sex records clean, they would not suffer the severe depreciation which they do sustain in the eyes of superior women. But let us not take that ambiguous shibboleth "the single standard of morals" to mean a general sex strike, that is, ostracizing every man who has had illicit sex experience. This is too extreme. Early offenses where infection did not occur or has been positively cured, though properly considered a severe drawback, should not be perpetually condemning when followed by reform and real love. Such an unforgiving and uncompromising position can not be approved, because it leads a very large number of women into celibate lives, with a serious dysgenic result. In addition it increases the temptations of the men left unmarried. These extremists must remember that it is hard to get men to marry at even a normal rate, as current statistics abundantly prove. Therefore, the threat of a sex strike will never enforce chastity. Slow and hard as it is, we must content ourselves to build up a sounder moral basis by better attested methods.

HONOR FOR MOTHERHOOD.

Inappreciation of wifehood and motherhood by misguided feminists must cease, and greater honor and appreciation must be meted out to mothers, in order to more than compensate for the recognition that women earn in rival occupations. Women should

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[5]The following table from C. S. Castle (Statistics of Eminent Women, in Pop. Sci., Mo., June 13) shows the age at which eminent women in history have married:

Century	*Average Age*	*Range*	*No. of Cases*
12	16.2	8–30	5
13	16.6	12–29	5
14	13.8	6–18	11
15	17.6	13–26	20
16	21.7	12–50	28
17	20.0	13–43	50
18	23.1	13–53	127
19	26.2	15–67	189

It is to be noted, furthermore, that if the American women of the 19th century in this table are separated, their average age at marriage is found to be 27.7 instead of 26.2.

Thorndike's statistics on marriages among college women (1901) show that:

45 per cent. of college women marry before the age of 40.
90 per cent. of all United States women marry before the age of 40.
96 per cent. of Arkansas women marry before the age of 40.
80 per cent. of Massachusetts women marry before the age of 40.

In Massachusetts 30 per cent. of all women have married at the age at which college women are just graduating. (Marriage among college women. Outlook, October 5, '01.)

properly be permitted to do any work they wish, not incompatible with their well-being; but *greater* honor and esteem is due those who have not shirked the paramount function and responsibilities of motherhood.

While waiting for separate colleges to become co-educational, as they eventually will, their present dysgenic tendency can probably be reduced by the gradual introduction of men teachers into the women's colleges. Women professors tend to foster celibate career-hunting, which, attractive as it is to many young women at first, in most cases is eventually unsatisfying. Furthermore, the introduction of courses dealing with the home and the child would give college women increased interest in and eagerness for that noblest profession of home-making and motherhood.

Let us not err in our efforts to teach chastity by making sex appear an evil thing. This is a terrible mistake and all too common. One of my students, referring to a widely read sex book for young men, said one would infer from it that all married men suffer a serious sacrifice in health. I am confident that much of the celibacy of women may be blamed to ill-balanced mothers and others who, in word or attitude, build up an impression that sex is indecent and bestial, and engender a general, damaging suspicion of men.

CAUTION IN SEX EDUCATION.

It is necessary to keep our heads level in the sex ethics campaign. The venereal diseases will probably, if we can continue our present progress in treatment and prophylaxis, be brought under control in the course of a century, while the problem of differential mating and the fecundity of the superior stocks will be with us as long as the race lasts, which we may expect to be tens of millions of years. Let us not present too luridly, by drama, novel, or magazine story, dramatic and highly-colored individual sex histories. These often impress an abnormal situation on sensitive girls so strongly that aversion to marriage or sex antagonism is sometimes aroused.

The facts should be presented in a more dispassionate, scientific, proportioned, and psychologically sound way —not by cynics, but by competent, experienced, sweet-minded persons.

Eligible young people should have their circle of acquaintances broadened. Co-education,[6] I believe, is one of the best means, as associating the best groups. But many other means should be encouraged. We have in this a further justification of cards, dancing and theatres. That these may sometimes be pursued intemperately need not condemn them universally. These and other social devices extend the range of acquaintance, and also give the necessary time for mutual estimates and friendships. Others besides parents should feel some obligation to afford these social opportunities to young people. Surfeit for some individuals and dearth for others calls for curtailment here and encouragement there.

SELECTION CAN BE IMPROVED.

I now pass to the consideration of the objection so frequently heard that the selection of mates in man cannot possibly be improved, because it is wholly a personal and capricious thing. But the objectors on this score ignore the fact that three mental stages are normally passed through in this mate-

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[6]The following figures by Shinn (Marriage of college women. Century, October, 1895) show the marriage rate of college women, assuming graduation at 22 years of age:

Women Over	*Co-ed.*	*Separate*
25	38.1	29.6
30	49.7	40.1
35	53.6	46.6
40	56.9	51.8

Marriage Rate from Co-ed. Colleges in Nor. Atlan. 29.0; Mid. West 33.6.
Women in general marry most frequently at 20–25 years of age.
College women marry most frequently at 25–30 years of age.

choosing process. They fall into error by concentrating attention on the last, most obvious, emotional, "love-is-blind" stage. The first involves the broad determination of our associates. The second is the narrowing of choice to those whom we specially admire and elect as friends. The last is the actual "falling in love."

One of the chief factors in this first stage is the structure of the social unit to which we belong. How frequently matings are determined by the school, church, or neighborhood! Then there is another group, composed of our parents' chosen friends, with whose children we are naturally thrown. The mother who sends her girl to the university rather than into the *thé dansant* set, determines largely the type of her daughter's fiancé, not only because her associates are different in the two cases, but because the girl's ideals will be differently built up. The young man who goes with fast girls is indirectly determining the kind of girl he will marry —if, indeed, he is not thereby led to abandon marriage. During this second stage of more intensive associations or friendships, there is clear-headed discrimination, before the emotions have become imperious. I believe that the period of mere friendliness is longer in most cases than the period of conscious loving before marriage. So we see the choice of a mate is not ordinarily capricious.

ASSORTATIVE MATING.

To show you that marriage selection does really operate, I have collected in a table the cases so far observed showing assortative mating[7]. This may be defined as the degree to which like mates with like. This does not have as great a eugenic significance as preferential mating, but the latter has not yet been so well demonstrated. Assortative mating has the value, however, of building up the unusually able brains the world needs. In this table 1 expresses perfect assortative mating, that is, each degree always mating with the corresponding degree. O expresses random mating. You will notice in the royal families that assortative mating is low because interfered with for state reasons.

My student, Miss Carrie F. Gilmore, has found a preferential mating in facial appearance and class marks.

Thus in the class of 1902 of the Southwestern State Normal School of Pennsylvania, where the marriage rate of graduates is 43.7 per cent. (status in 1912), it is found that the marriage rate among the girls who got marks of 90 or over in their studies is about 56 per cent.

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[7]ASSORTATIVE MATING.

1 = complete.

Trait	*Investigator*	*Index*	*Probable Error*
Stature (Eng. Mid. Class)	Pearson-Galton	+.09	+.04
Stature	Pearson	+.2804	+.0189
Age	Lutz	+.75	+.
Cephalic Index	Boas	+.15	+.10
Deafness	Schuster	+.90	+.
Normality (Fam. With Crim'ls)	Goring	+.11	+.
Longevity	Warren et al	+.22	+.02
Intelligence	Elderton et al	+.33	+.
Temper	Elderton et al	+.18	+.
Excitability	Elderton et al	+.11	+.
Sympathy	Elderton et al	+.15	+.
Reserve	Elderton et al	+.27	+.
Success in career	Elderton et al	+.48	+.
Insanity	Elderton et al	+.30	+.05
Intelligence (royal)	Woods	+.80	+.076

Preferential mating is also indicated in the data[8] regarding college women and their non-college sisters, cousins, and friends as collected by Miss M. R. Smith.

FORCE OF PUBLIC OPINION.

Marriage selection is under some degree of legal control through marriage and divorce laws. Those who maintain that mating is wholly capricious forget the very considerable extent to which social control has made itself effective in the past. Indeed, many of the prohibitions are now relaxed, such as the notorious deceased wife's sister provision. It is obvious that marriage laws should make as few restrictions as possible without strong reason. A minimum age and a high degree of consanguinity have been an almost universal matter for legislation or enforced custom. And let it be noted, their object has been primarily eugenic. A relationship closer than that of cousin should constitute a prohibition. Yet cousin marriage need not be denied except in the event of that branch of the family, common to the cousins in question, having individuals with certain specified defects. The suggestion that proposed cousin marriages should be passed upon by a state eugenic board, although biologically sound, does not seem so from the sociological standpoint. In case of an adverse decision, there would follow either broken hearts or a liaison, for the hope of a favorable decision would have engendered a strong attachment. Freedom from venereal disease—at least for men—must be attested to by competent physicians by competent tests, the state assuming a share of the financial burden. It does not seem wise, however, to demand freedom from all mental and physical defects, for if the defect is very serious, a surer method must be employed than the withholding of a marriage license. If it is less than very serious and not pernicious, we are not justified in prohibiting marriage, provided it is the earnest intention of the couple not to reproduce. In the event of such a marriage proving fertile, sterilization would prevent a second offense.

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[8]COLLEGIATE ALUMNAE DATA, 1900.
M. R. Smith, Statistics of college and non-college women. Pub. Amer. Stat. Assn., VII. p. 1.

Percentage of Married	*College*	*Equivalent Non-College*
Under 23 years	8.6	30.1
23–32 years	83.2	64.9
33 and over	8.0	5.0

Age at Marriage { 26.3 college; 24.2 sisters; 24.7 cousins; 24.2 friends } 24.3

	No. of Children	*Per cent. Childless at time*
College	1.65	25.36
Equiv. Non-Coll	1.875	17.89

Occupations of Husbands per cent.	*College*	*Where Wife is Equiv. Non-College*
Col. Teachers	65.9	51.4
Other Teachers	23.3	11.8
Lawyers	15.7	11.2
Physicians	9.0	8.6
Scientists	2.0	0.6
Clergymen	7.0	4.8
Artists	0.9	0.3

Income of Husbands	*College*	*Where wife is Equiv. Non-College*
Less than $2,000	24.5	36.7
$2,000 to $5,000	46.5	44.1
Over $5,000	27.1	16.9

Miscegenation of certain races may properly be controlled as far as possible by the refusal of marriage licenses and by public opinion. This will unfortunately result in cases of individual injustice, but is nevertheless racially necessary. The proposition to refer doubtful cases of mixed blood to the state eugenic board is objectionable, for the same reasons as above.

THE DIVINE QUESTION

While society may deny the right to marry only for grave cause, it should be glad to divorce pairs whose progeny are not desirable. This for the reason that in one case society is acting against the will of the two parties. In the second case both the two parties concerned and society profit by the divorce. Divorce is far preferable to separation, since the unoffending party should not be denied the privilege of remarriage, as the race in most cases needs his or her contribution to the next generation. Divorce, it must be remembered, is ordinarily just a legal recognition of a separation that already exists. The time-honored and justifiable grounds of adultery, sterility, impotence, venereal infection, desertion, non-support, and habitual cruelty are no more worthy of legal recognition than the cacogenic grounds of drunkenness, feeble-mindedness, epilepsy, insanity, or other specified serious mental, moral, or physical defects.

For sexual selection to work at its best, it is desirable that the mated persons be as superior as possible to the unmated. Is it not, then, a social blunder to deny divorce to a married pair, if one of them at least is inferior? We hear much of a divorce evil but we have in reality a divorce remedy for the evil of ill-mated pairs.

Dysgenic marriage we can not prevent as frequently as would be desirable, because we have not the co-operating will of the couple. When, in such undesirable marriages, the individuals come to see their mistake, society should gladly welcome the prompt undoing of the marriage bond.

In closing let me urge you to do all in your power to correct this growing tendency to postpone if not to abandon marriage entirely, on the part of our superior young people. Hold out marriage as one of the ends of a useful, normal, beautiful life. Help superior young people to meet, and encourage and further their *early* marriage. Give more honor and appreciation to those who have married well and have had adequate children. And in whatever ways you properly can, reduce this appalling percentage of superior celibates who are thus pulling down the quality of the human race.

ANNUAL MEETING OF ASSOCIATION

The annual meeting of members of the American Genetic Association was held in the Cosmos Club at Washington on January 8. The secretary reported that more than 200 new members had been received during the last year, in spite of the fact that the work of the association was suspended during the greater part of the year. The membership on the first of January was 1837, of whom, however, 313 were delinquent in their dues. The membership at the present time is increasing at the rate of more than a hundred each month. The number of foreign members is increasing with exceptional rapidity.

The treasurer's report showed that expenses of the year had just about been met by the income, leaving the guarantee fund intact, to meet the increased expenditures due to the publication of the magazine as a monthly.

The council for 1914 was elected as follows:

One-year term: Alexander Graham Bell, W. E. Castle, Bleecker Van Wagenen.

Two-year term: O. F. Cook, David Fairchild, Arthur W. Gilbert.

Three-year term: George M. Rommel, T. H. Kearney, W. C. Rucker.

At the annual meeting of the council, the present officers were all re-elected.

President Fairchild announced the make-up of the research committees for 1914, as printed on the back cover of the present issue of the Journal.

SEEKING PLANT IMMIGRANTS

Explorations in Asiatic Russia, in Search of New and Valuable Plants Suitable for Introduction to the United States—Desert Flora not Rich in Species—Small Forests Established in Pure and Moving Sand—Fruits Mostly of Commonplace Character—Trying Conditions of Work.

FRANK N. MEYER

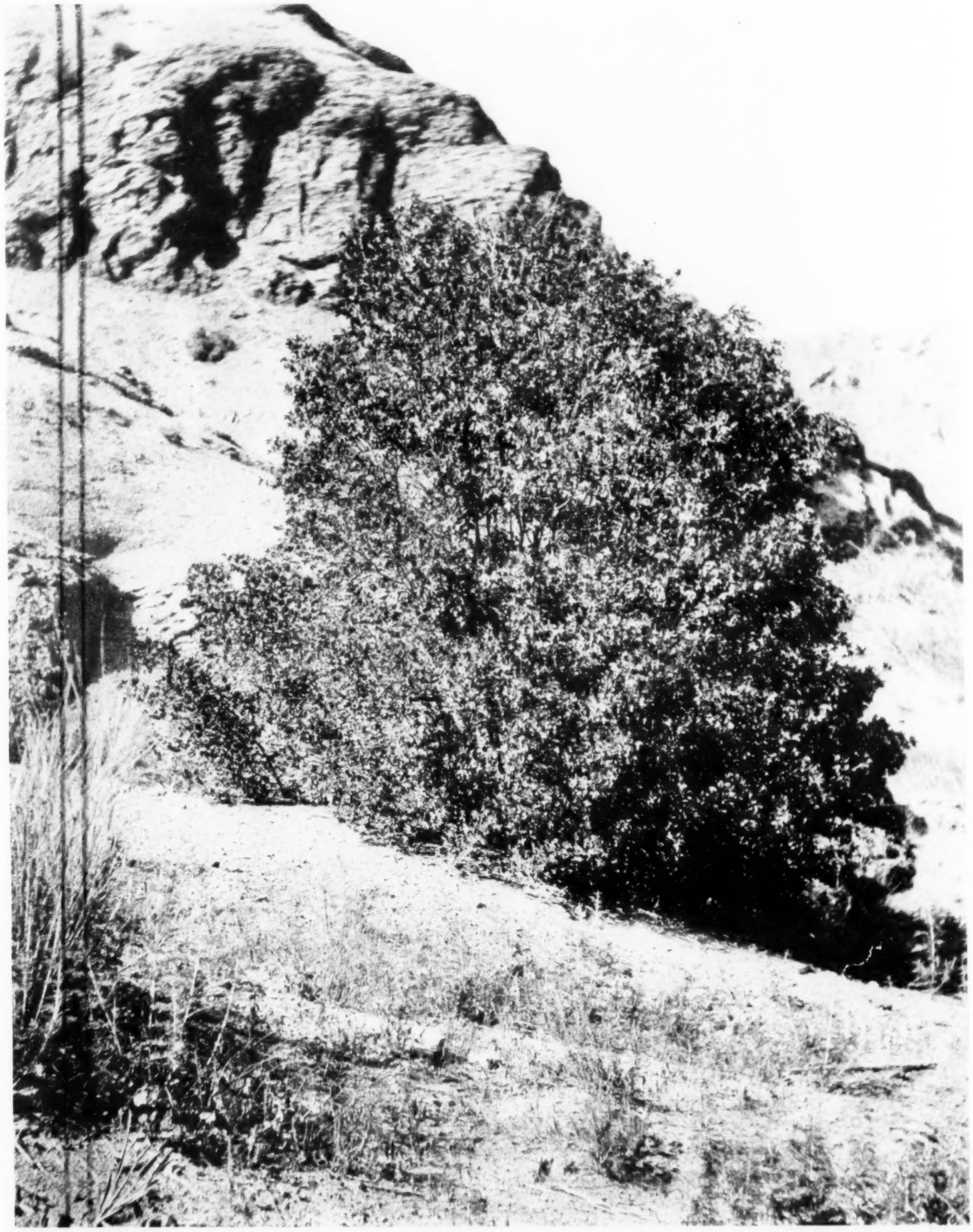
Agricultural Explorer, Office of Foreign Seed and Plant Introduction, Bureau of Plant Industry, United States Department of Agriculture, Washington D. C.

Although plant breeders realize in a general way that new material is constantly being furnished to them, and that new crops from time to time make their public appearance and assume a prominent place in our agriculture, while old ones are frequently being improved by the spread of newer and better forms, few understand in just what way these new plant immigrants are secured. It has seemed, therefore, that an account of some of the work done in Asiatic Russia by an American citizen of Dutch birth, Frank N. Meyer of the U. S. Department of Agriculture, would prove of great interest to American plant breeders, while his graphic pictures of these semi-civilized countries are certain to attract the general reader as well. The following article is made up solely of extracts from Mr. Meyer's letters to his chief, the scientific names being in the form used by him and not neccessarily the form accepted by the botanists of the Department. The illustrations are all from his original photographs—The Editor.

ASKABAD, TURKESTAN.
June 7, 1910.

WELL now, you'll no doubt be interested to know how I got into Central Asia. We left Baku on Monday night, May 30, and landed the next afternoon in Krasnawodsk, where we found a few police officers and gendarmes asking us for our passports. My name had been booked already for months and I was informed that all my requests to explore and photograph had been granted and that the various authorities had been instructed to assist me. On June 1, I received my passport back and left in the afternoon for Kizil-arwat, where according to my interpreter's belief many rare Persian seeds could be obtained. When we arrived there the next day, we didn't find it to be so, as most of the Persian population had shifted to Askabad and Baku. In the afternoon we left again for Bachar-den, a small town near to the mountains, where some fine native vegetation was said to occur.

To obtain a cart consumed the whole next day (June 3) but we left at four o'clock in the morning of June 4. Our cartman, a conceited Armenian, professed to know the country, but—at eight o'clock we were quite at a loss where we were and we camped in the open. On June 5 we found a soldiers' post, for we were close to the Persian frontier, and made our headquarters there for that day and on June 6 we returned again to Bachar-den. I found some interesting plants during these days; an ornamental Eremurus, a few species of Tamarix, an Acer, *Cerasus microcarpa*, Prunus sp., Rhus sp., interesting grasses, etc. We made a goodly pile of herbarium material which will reach you in due time.



WILD MAPLE OF TURKESTAN.

This unidentified species of Acer grows on the hottest, dryest and most arid slopes of the mountains of Bachar-den, at elevations of 5,000 feet and over. Its small leaves vary widely in shape, all forms being found from tri-lobed to entire. It probably has some value as an ornamental in the most severe parts of the southwestern United States. (Fig. 4.)

PRUNUS MICROCARPA AT HOME.

Central Asia contains many varieties of hardy plums, some of which are already valuable commercially, while others offer most promise as stocks on which to graft improved varieties for propagation in desert regions. Even in their wild state, the fruits are prized by the natives of Turkestan, and with a little cultivation they are considerably improved. This photograph of *P. microcarpa* (standing in the center of the picture) was made on June 4, 1910, in the mountains of Bachar-den, Russian Turkestan. (Fig. 5.)

IMPRESSIONS UNFAVORABLE.

I cannot say that my first impressions of Central Asia are so very pleasant, after having seen so much of the beautiful Caucasus. There is much heat, much dust, much vermin here, and relatively little comfort—even washing water is hard to get. The vegetation too, is, as could be expected, not very varied in general. Around the houses and railway stations one finds mostly our Acacias (*Robinia pseud-acacia*), *Ailanthus glandulosus*, *Ulmus pumila*, *U. campestris*, *Populus bolleana*, *Sophora japonica*, *Koelreuteria paniculata*, *Morus alba*, *Gleditsia triacanthos* and here and there an Osage Orange (*Toxylon pomiferum*). All those trees are periodically irrigated. If not, they die within one or two years. In Krasnawodsk, however, where it is quite mild in winter, I noticed a beautiful flowering bush, *Poinciana gilliesii*, which thrives with very little irrigation; *Elaeagnus angustifolia*, *Populus diversifolia*, and a species of Saxaul-bush (*Ammodendron?*) also need very little water. There are, however, apparently few trees to be found that resist the aridity of the Central Asian plains, where hot summers are followed by cold winters, while high winds blow very frequently both winter and summer. The trees that looked the best are the native form of *Ulmus campestris*, the Chinese *Ailanthus glandulosa* and the North American *Robinia pseud-acacia*.

ALFALFA FROM THE MERW OASIS.

An enormous trade in alfalfa seed has been created in Turkestan, since the merits of the varieties native to that country were advertised by American explorers. South America takes a larger quantity than does the United States. According to Russian experts, the Turkestan alfalfa is somewhat short-lived, but this has not prevented the annual export of seed mounting to hundreds of thousands of pounds each year. The trade has proved decidedly profitable to the natives, since their camels will readily eat the alfalfa even if it is somewhat damaged by threshing. (Fig 6.)

SHORE OF THE CASPIAN SEA.

Various species of Tamarix, woody Chenopodiaceae and other salt-loving plants grow fairly luxuriantly. These Central Asian tamarisks promise to have some value for the desert of the south-western United States, as they grow vigorously even in moving sand, binding it together, and furnishing a fuel supply to desert dwellers. They often grow in soil of which the surface is covered by a thick, white deposit of alkali, and many species produce attractive flowers. Photographed at Krasnawodsk, Turkestan, June 1, 1910. (Fig. 7.)

AGRICULTURE IN SAMARKAND.

SAMARKAND, TURKESTAN,
June 27, 1910.

Alone in Samarkand! My assistant got tidings from home yesterday that his presence was urgently needed, as the man in charge of his farm was severely injured by a horse, and he left me. The interpreter had left the day before, as his eyesight and general health had become rather bad these last days on account of the great heat, and so it has come to pass that I am left alone in this far-away land, with only a mere smatterfog of Russian and no knowledge at all in the Sart language, which is much spoken here. I'll get out of it, however. We found a German, who may be willing to go with me; his looks, however, didn't please me, and to go with a stranger in some out-of-the-way places, with the necessarily large amount of money I generally have with me, is not a safe proceeding.

Well, my last letter was from Askabad, dated June 9, 1910, and it was again a holiday, of which the Russians only keep about thirty-eight a year. The next day I went with the interpreter to the Experiment Station about four werst from the city. There wasn't much to see: some plots with cotton, some alfalfa fields, various beans and a tree-nursery, where somewhat more

DESERT POPLAR OF TURKESTAN.

Populus pruinosa in the city park at Krasnawodsk. Although it is difficult to propagate, this tree is highly desirable for desert regions, as it needs almost no water. The wood is hard and lasting, but it does not attain great size. (Fig. 8.)

weeding could be indulged in without any harm.

On Saturday, June 11, we wanted to leave early, but I got a message from the police to appear before them. Something new, I thought. Well, we went and the whole thing was nothing but a curiosity to see me. The captain, or whatever his rank was, asked my interpreter whether I really was a botanist, whether I only had interest in plants, and more such suspicious questions. He then told us that permissions had come from St. Petersburg, allowing me to photograph trees and plants only, and that for every locality I wanted to visit, I had to get a special permission either written or verbal, depending upon the importance of the place. But —under no consideration would I be granted permission to go to the Afghanistan frontier, as foreigners were not allowed! Well, I knew already most of these matters, having made enquiries beforehand. We thanked the police-officer kindly and I was glad to have my passport back again, which they had kept all the time I was in Askabad.

ARRIVAL AT MERW.

We left the same day for Merw, where we arrived after midnight. The next day, June 12, was exceedingly hot, and the light so intense as to make one almost dizzy. We took out the collected herbarium material, which wasn't all dry yet, and gave it an airing —much trouble herbarium material causes on a journey! In Merw there is a pretty park, where tall specimens of poplars occur (*Populus alba pyramidalis*). I also saw there for the first time in my life some fine large specimens of the "Karakach" (*Ulmus campestris*

IN THE CITY PARK AT MERW.

The most conspicuous trees, and the ones best adapted to arid portions of the United States, are the white poplar (*Populus alba bolleana*) in the center, and the Karakach (*Ulmus campestris umbraculifera*) at the right. The white poplar is the principal lumber tree in Turkestan and is widely planted, the trees being sometimes no more than five feet apart. They are free from disease and grow rapidly, even on rather alkaline soils. It can be pollarded successfully. The species is doubtless native of Chinese Turkestan, and is therefore thoroughly accustomed to a severe desert climate. (Fig. 9.)

umbraculifera); very striking trees they are, with their umbrella-like shape and a dense mass of rather small foliage. These trees will be highly appreciated by our settlers in the desert regions. These elms, although drought-resistant, have to be watered. Other trees in that park are *Acer negundo, Robinia pseudacacia, Sophora japonica, Ailanthus glandulosa, Gleditsia triacanthos, Salix babylonica, Toxylon pomiferum, Catalpa bignonioides, Morus alba, Cydonia vulgaris, Prunus armeniaca and Pirus communis.*

A GERMAN SETTLEMENT.

On Monday, January 13, there was a great market held in Merw; Turcomans, Afghans, Kirghisians and many other wild looking inhabitants of these regions here, mingled through one another. The products that were brought in were mostly very poor, like the fruits and vegetables for instance. I bought some barley, millet and wheat, but found little new. In the afternoon we hired a cart and went to a German colony thirty werst northeast of Merw. The cultures are not in the pitch of perfection, as it is a rather new colony. The system of cotton-culture is as the Turcomans have it, viz., a field is divided into a number of square plots, each plot with ridges all around. The cottonseed is sown broadcast by hand and the plots are flooded whenever they get dry. Cultivation of the land is not much practised beyond keeping the weeds down.

Well, the results of this antiquated system of culture are: First, that the stand of the cotton is very irregular; second, much water is wasted by not cultivating regularly; third, by not sowing in rows, all of the weeding and cultivating has to be done by hand; fourth, in case of failure of water, as occurs often, the small plots of land dry out to such an extent, that the harvest becomes almost nil. The alfalfa fields, however, looked very nice and they found this useful plant their steadiest money-maker. In fruit and vegetable culture one could clearly see that time and knowledge were lacking. In general one has to sympathize with such German settlers who are willing to rough it in such far-away corners of the Russian Empire, where they, at the utmost, are able to become owners of small plots of land, without having any of the pleasures or culture of the more progressive races of men.

THE USEFUL CAMEL'S THORN.

The desert around Merw is quite interesting. The camel's thorn, *Alhagi camelorum*, covers tens of thousands of acres of land. It was in full bloom and its small pinkish-purple flowers, produced by the million, gave color to the landscape, just like the heath in northwest Europe does. This camel's thorn is a very useful plant here. Firstly, it is a great feed for the camels, who are said to love this plant better than any other wild herb. Secondly, it is mown, dried and used as a fuel. Nearly all of the bricks in the oases are baked through the heat of this plant. Thirdly, it is a great sand binder, growing even in pure, sterile sand and as it is leguminous, it prepares the soil, by enriching it, for better vegetation. As I move along I may find out still more about this plant.

Beside the camel's thorn there also grows a very spiny acacia-like plant, in the desert. It is not ugly as a solitary plant, but it is a bad weed on all untrodden places; some Lyciums I saw, too, and a few minor things, but as a whole the desert flora is not rich in species. One finds, however, in the desert around Merw many canals, some still in use, some dried up; they say that some of these man-made watercourses are 3000 years of age and, if so, there is surely "little new under the sun", so far as irrigation is concerned. The present people here have a great hope for the future as far as the bringing-under-culture of desert land is concerned. Large, new canals are being dug, new settlements started, and with present high prices of cotton, people can be comfortably off in some years time.

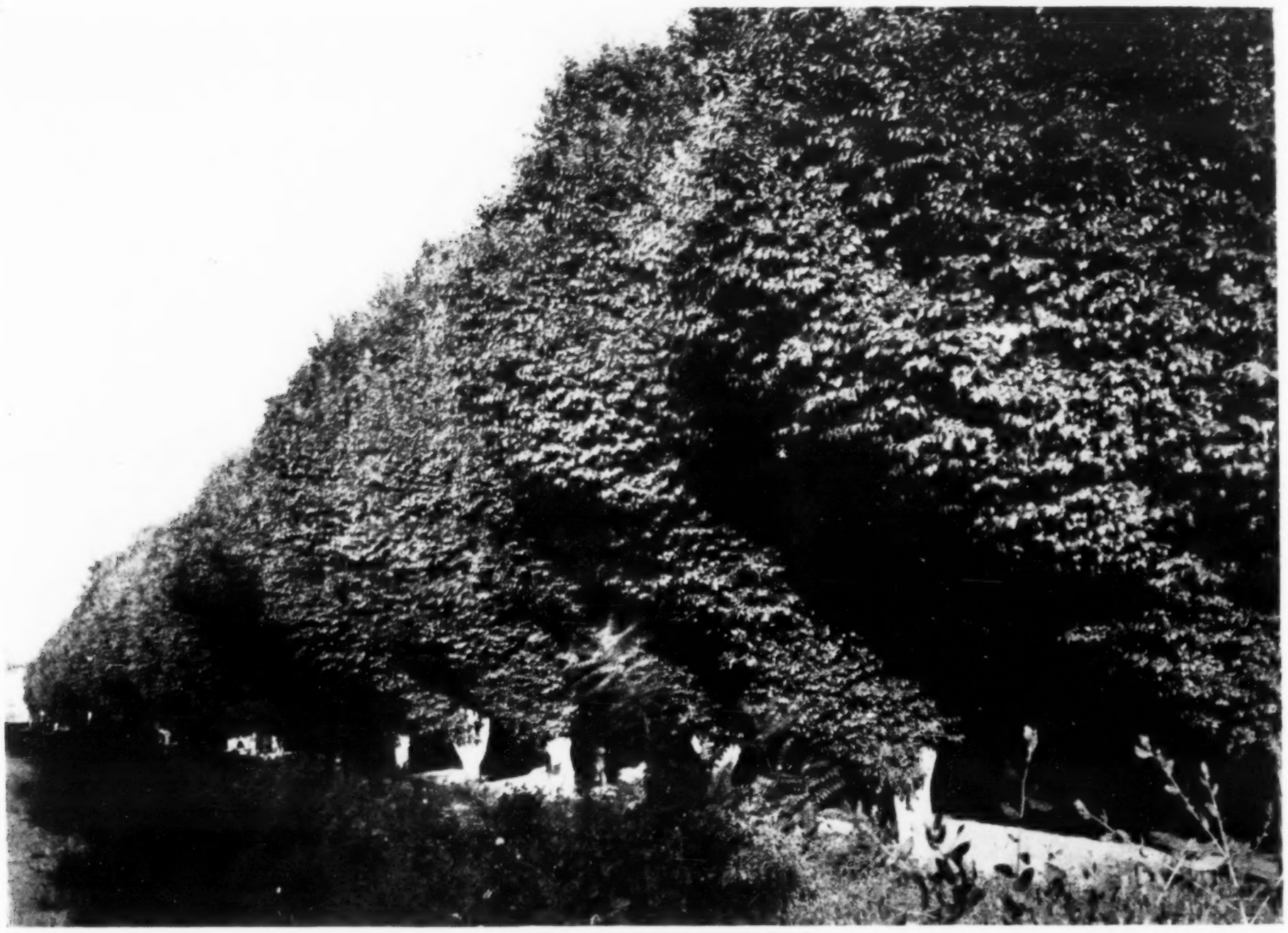
AT THE IMPERIAL ESTATE.

On June 16 we went to the Imperial Estate, "Murgab", where fine things were reported to exist. We looked at the very imposing avenues of the Karakach, saw the fruit-orchards, where the apricot trees were fully as heavily loaded as in California, saw the nurseries with fruit and ornamental trees of many kinds. There are a few varieties of apricots and of pears and quinces, that seem out of the ordinary and of which I hope to get scions or plants. Well, after we had looked around for a couple of hours we went back to the police again and this time found the chief himself, a tall, elderly, soldier-like chap, who had looked up all our references and had come to the conclusion that when St. Petersburg allowed me to take photos of trees and plants, there wouldn't be any crime committed if he also permitted me to do so, but to be on the safe side he gave a swarthy policeman to show us the beauties of the place

On Friday, June 17, we left Merw again for Chartchui, this time with the assistant, who had gotten his passports into shape. He is an honest fellow, who served his three years as a soldier, and loves the mountains better than the routine work of his little farm.

FOREST IN MOVING SAND.

On Saturday, June 18, we first paid a visit to the police where we were informed that, although photographing was allowed in Central Asia, this district was exempted from it, as it was in Bokhara, and the Political Agent in the city of Bokhara, alone had the power to give that permission. No wonder that



AVENUE OF KARAKACH TREES.

This fine row of *Ulmus campestris umbraculifera* was photographed on the imperial estate Murgab, at Bairam-Ali near Merw, Russian Turkestan, on June 16, 1910. The tree endures drought and a fair amount of alkali, and is as useful for shade purposes as is the umbrella tree (*Melia azederach*) so widely cultivated in desert portions of North America. Grafted forms of the Karakach are propagated by the rich in Turkestan, in order to ensure a solid head of shade. (Fig. 10.)

so few photographs of Central Asia are to be had, is it? Well, I then called on W. A. Palletsky, in charge of the sand-binding work along the railroad in Central Asia. I found him to be a most pleasant man who had a railroad trolley come before his house and off we flew over the imposing Amu-daria river, along whose level shores some of the world's finest melons grow, along sandy hill and plains, all planted with sand-binding plants until we were eight or ten werst out, where the plantations were the oldest. It is most interesting to see how the tall bushes of *Calligonum caput-medusae*, *C. arborescens*, *Salsola richteri* and *Haloxylon ammodendron* have grown into some sort of a forest in a soil that is almost pure sand and, worse than that, a moving sand! And stranger, even, to see how a few seeds of the Chinese Tree of Heaven (*Ailanthus glandulosa*) have found lodging between these real desert plants and have grown vigorously, too, and are of fairly good sizes now. Mr. Palletsky said the real Saxaul (*Haloxylon ammodendron*) is an aristocrat—in other words, it is not a plant one can plant straight away on a shifting sand. First other vegetation has to make the soil firm, after that the Saxaul will grow. To arrest a shifting sand-hill, one first has to plant various Calligonums, then *Salsola richteri* and after that *Haloxyon ammodendron*. Of the Calligonums there is an immense mass. Up to the present fifty-seven different species have been found, and there are still more. However, only thirty have been scientifically deter-

CITY PARK IN KRASNAWODSK.

The hedge in the foreground is *Poinciana gilliesi*, and the tall shrubs are *Ulmus pumila*. Both of these shrubs are valuable for arid climates with scorching summers and mild winters; the former has long been esteemed in the United States. Photograph taken at Krasnawodsk, Russian Turkestan, June 1, 1910. (Fig. 11.)

mined and the others will come in the course of a few years. Some of these Calligonums are strictly local plants and may not readily bear acclimatizing —at least Mr. Palletsky found that the species from around Oremburg and Astrakhan do not stand the long, intense heat at Chartchui.

WORK IN NURSERIES.

After having seen the large plantations, where the plants are now spreading rapidly and require practically no care any longer, we paid a visit to the nurseries where seeds are sown and young plants raised. They had experienced a very late frost and the stand of the plants was not what they wished it to be, still it was interesting to see how the sand was held in check by long straw stretched over it, this kept in place again by little sticks set across it at the ends. Hedges of Tamarix sp. and of the wild form of *Elaeagnus angustifolia* kept the great winds off. The seeds are all sown in the autumn and have to be kept moist as long as they haven't germinated; when once above the ground, however, great care is necessary in keeping them almost dry, as otherwise they perish.

Then Mr. Palletsky showed me with much pride an Opuntia cutting, which he had obtained from us through the St. Petersburg Botanical Garden, and which cutting was growing nicely. He was very grateful to have it, and had six more distributed at different points in Central Asia. But then we began to talk about lowness of temperatures here and he said that the minimum had been 14° Reaumur (Zero F.). Well, then, I said

that all of his spineless Opuntias would go, and even long before that, telling him of the experiences at San Antonio, where all the spineless forms of Opuntias froze when it was 12° Fahr.

EXPERIENCES IN BOKHARA.

SAMARKAND, TURKESTAN,
June 28, 1910.

As I said, I arrived in New Bokhara on Sunday afternoon. On Monday we went to the police for passport and photograph matters, but it was a holiday again and we couldn't do a thing, so we went to Old Bokhara and had a glimpse around. The interpreter pretended to know all about the town, but I found him to be misinformed, like I had experienced several times these last days, and his eyes had become so bad these last hot days that when he passed from the light into the shade we had to assist him, otherwise he fell into holes and ditches. So we returned in the evening without having seen the grain market or Mr. Parkinson.

The next day, Tuesday, June 21, we went again to the police and saw the Political Agent, a gentleman of shrewd appearance and possessing much power. He said that I would be permitted to travel in the Hissar Mountains in Central Bokhara and take photos of botanical subjects; he thought it, however, advisable that I shouldn't go alone and wishes me to have a Bokharian official go along, I having to pay him a salary and sustenance. My route of travel he also wishes me to send him.

I answered that I couldn't decide right on the spot how these matters will go, as I expected important mail in Samarkand and have to supply me yet with a tent and some more camping outfit.

That was all right, he said, he only wished me to know that Bokhara is not an easy country and travelling alone without a native of some standing would be extremely difficult. He also said I will not be allowed to go near the Afghanistan frontier, as no foreigners are permitted to go there.

PRODUCTS OF SART GARDENS.

In the afternoon we repaired again to Old Bokhara, took a droshky and drove to the office of Dürrschmidt & Co., where Ernest Parkinson, of the Reichardt Asiatic Trading Co., resides. We found him and William Donohue at home and had a long talk. The weather was very hot, 114° Fahr. in the shade, but Mr. Donohue went with us and showed us the grain market, the medicine shops and other points of interest. As it became late, however, we made arrangements to come back early next day. And so we did. Then Mr. Parkinson went with us, too; we bought some seeds, like wheat, cowpeas, hemp and poppy, and saw a real Sart garden where grapes, apricots, apples, pomegranates, quinces, peaches and figs were grown. The pomegranates and figs have to be buried, however, every winter, but still they bear fruits.

In general, from what I saw, I cannot say that there was much of interest to be found among the seeds and plants. They are apparently all well known. For fruits I am apparently somewhat early yet. Grapes are just coming in, but they are small and not very fine. The apples are greenish and, though ripe, of a very insipid taste. Apricots are small and apparently most times seedlings, though a few of fine, melting flavor are once in a while seen. The plums one sees now are those of *Prunus insititia* and perhaps also of *P. divaricata* and there is much variation among them, although the fruits are small. The muskmelons are just coming in and two kinds there are, the one greenish and generally split open and the other yellow ones, small in size, but of very sweet and melting flesh. I was assured that later in the season fine large plums and still better grapes and melons are coming, but that is a few months later.

Eugenics Not Impossible

There is nothing either in the history of domestic animals or in that of evolution to make us doubt that a race of sane men may be formed, who shall be as much superior, mentally and morally, to the modern European, as the modern European is to the lowest of the negro races.—Francis Galton: Hereditary Genius (1902).

TESTS FOR MENTAL DEFECTS

How the Public Health Service Prevents Contamination of Our Racial Stock by Turning Back Feeble-Minded Immigrants—General Characteristics Noted and Progressive Series of Tests Applied to Determine Exact Mentality.

HOWARD A. KNOX,
Assistant Surgeon, United States Public Health Service, Ellis Island, N. Y.

BEFORE one enters upon a search for a thing he must know definitely what he is seeking, else the object of his quest may pass him unnoticed. This is even more true with regard to the various grades of mental enfeeblement than in the case of any physical infirmity because there still exists considerable chaos in the minds of many as to just what constitutes mental deficiency.

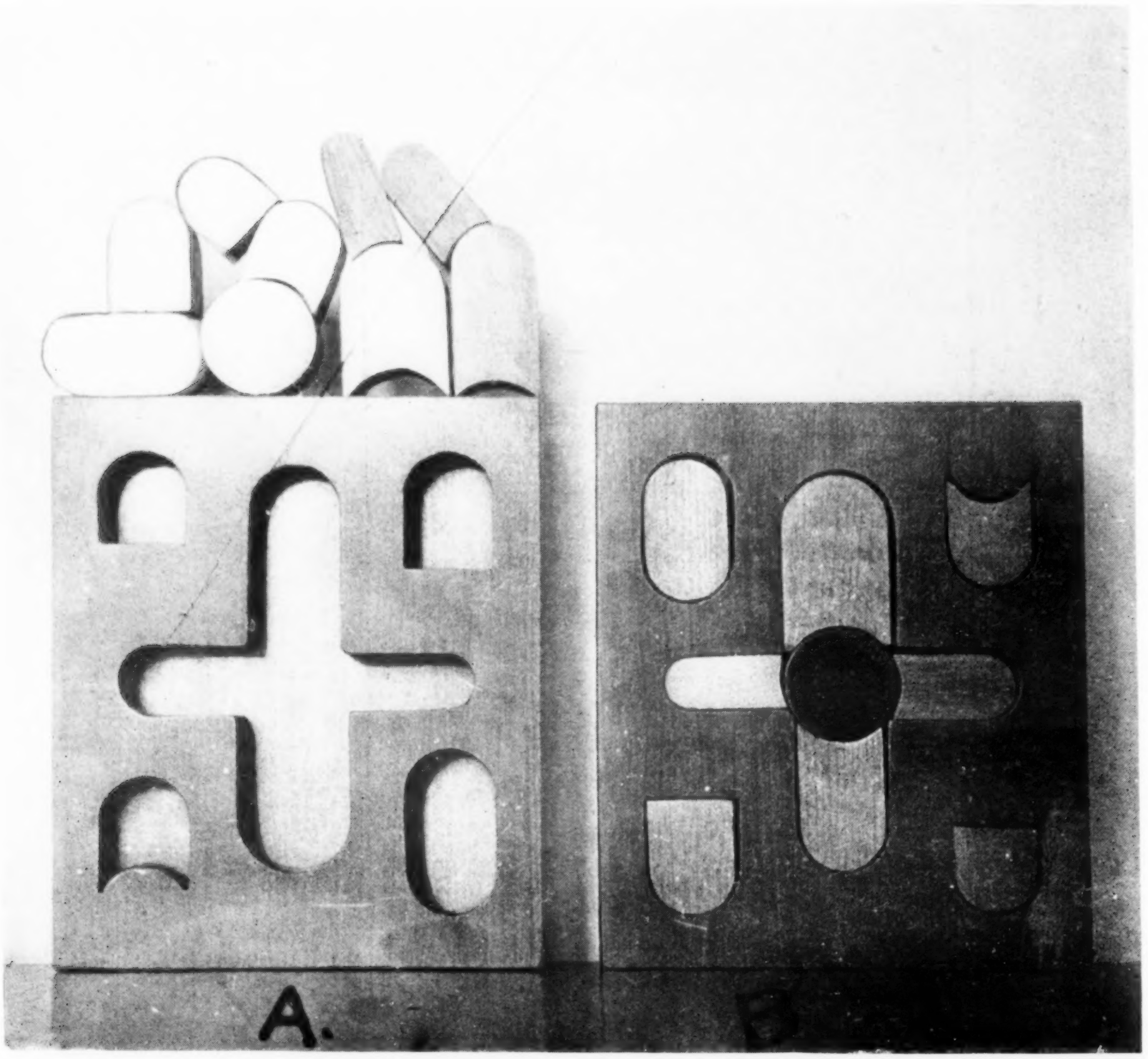
Some have attempted to formulate a social definition and hold that anyone, not actually insane, who is unable to reside harmoniously in the environment to which he is accustomed, and in compliance with its laws and customs, is defective mentally. This definition, while it includes many defectives, leaves out nearly all the potential ones and the majority of the higher ones that are not criminally inclined. Its application would necessitate turning all defectives loose in the world to see whether they can keep out of public institutions. This is exactly what some of the doctors and lawyers representing some of the immigrants would like to have done in the case of feeble-minded aliens who are detained at immigration stations. Fortunately the laws are such that feeble-minded aliens may be certified and deported before they have had an opportunity to contaminate the blood of the nation or to commit any crime.

The United States Public Health Service has worked laboriously and intensively to determine the standards of knowledge of the various races. The standard and definitions of feeble-mindedness are based on what a given subject can do, his previous environment, education and the stress under which he may be laboring being taken into account. In short, the tests are functional tests of the brain used in much the same way as functional tests are used to determine the amount and quality of work which the kidneys, for example, are capable of doing. The most successful test in use for the detection and classification of deficiency in educated children, namely the Simon-Binet Scale, is based on the same principle, that is, to learn exactly by experiment what normals can do with ease and to use the result of this work as a scale for weeding out defectives.

RECOGNIZING THE DEFECTIVES.

The public in the past has only recognized as defective those persons who are lacking in the intellectual sphere, in other words those who are stupid, dull and foolish. The emotional, volitional and criminal defectives have received scant attention. Yet, it is the latter, perhaps, who are the greatest menace. They are able to support themselves yet they are also able to reproduce the real old fashioned idiot and imbecile which the state must care for.

Now this being true, how may these potential inferiors be recognized? In the first place those who are themselves not markedly defective, but who are capable of transmitting weakmindedness to their progeny, usually possess facial peculiarities, temperamental queerness or both. For instance, as in the case of the frontispiece, the mother may possess many of the facial signs of a Mongolian defective and yet have no recognizable mental impairment. With a healthy husband who had a clean



THE "IMBECILE" TEST.

A normal six-year-old child can fit all the cut-out blocks into their places inside of five minutes, with not more than six false moves. All immigrants suspected of feeble-mindedness are asked to perform this and other similar tests; their exact degree of mental deficiency can thus be rated. For instance, if a ten-year-old boy requires five minutes to fit the pieces in this block, and makes half a dozen false moves, it indicates that he has only the mentality of a six-year-old. (Figure 12.)

family history, this woman produced a typical Mongolian imbecile child. This observation is so frequent that it is worthy of note. Temperamental peculiarities have been observed in the parents of defectives so frequently that these eccentricities are now regarded as the precursors of actual deficiency in the immediate or future descendants.

These peculiarities are cyclothymia (alternate periods of hilarious joy and deep depression), nerve storms, poorly controlled grief, temper yielding to minor excitations, untimely mirth, sensual morbidity and perversion, sullenness, facial tic and other minor neuroses, sick headaches, hypochondriasis (fear of bodily ills), signs of genius in certain lines, the use of bywords, the formation of strong habits, mannerisms, speech defects and other noticeable qualities that brand the possessor as "queer" in not only the eyes of the examiner but also in the minds of associates who may have known the individual all his life.

It has been suggested that these ill-defined entities come in one generation, while in the next two or three, definite psychoses and mental deficiency appear and in the generations succeeding the

TYPES OF DEFECTIVES WHO ARE DEPORTED.

The case of the girl at the right will serve as a specimen of all. She is 17 years old, illiterate, and was able to pass hardly any of the tests of 12 years and under, which were given her in the primary and three secondary examinations. Her common knowledge was meager; she did not know the date, the number of months or their names; could name the days of the week forward but not backward; could count from one to 20 but not from 20 to one; and even in comparison with other illiterates from the same environment, she proved notably deficient. She was accordingly refused admission by the United States Public Health Service inspectors at Ellis Island. Photographs reproduced from the Survey (New York), January 17, 1914. (Figure 13.)

latter, organic diseases of the central nervous system occur, with possible extinction of the line unless a strong new blood is introduced. No comment need be made upon this but there must be some good reason why we are not all insane or deficient.

MARKED CHARACTERISTICS.

Before taking up the actual tests used in detecting mental enfeeblement some of the characteristics that are possessed in whole or part by all such cases may be enumerated. They are:

(1) Dullness and stupidity and an inability to make use of such knowledge as they may have acquired.

(2) Faulty reasoning and judgment and an inability to correctly estimate sizes, shapes and forms; difficulty in understanding any new system of life to which they may be subjected and customs and methods of procedure in the everyday routine, etc. They may find it difficult to take the measure of other people and therefore become the butt for practical jokes and the prey of confidence men.

(3) Lack of ingenuity and native ability. Defectives are usually only capable of performing work that they have already learned after painstaking training in much the same way that an animal is taught tricks. They are unable to meet emergencies and to act and think for themselves. They therefore follow others blindly into crime or slavery without thinking of their danger. Persons like these blindly follow the mob leader, dynamite boss, gangster or cadet.

(4) Faulty attention and memory. The first of these renders it practically impossible to learn anything complicated. The second makes it unsafe to depend upon such persons to perform necessary acts with which they may be entrusted, e.g., safety work for railroad companies.

(5) Exaggerated egotism, which gives them confidence in their own abilities, often at the expense of others. Defectives are frequently lewd, obscene and quarrelsome. Sexual atrocities and murder accompanied by torture and mutilation have been committed by them in the frenzies of temper and passion to which minor disappointments will sometimes drive them.

(6) Selfishness and absence of the altruistic sense are common attributes, although the feeble-minded are at times very faithful to those who care for and protect them.

(7) Emotional instability and hysterical outbursts are seen in various degrees. Illtimed mirth and grief and unusual reactions to minor excitations are common.

(8) Exaggerated suggestibility which causes them to be easily led and misdirected by more gifted persons.

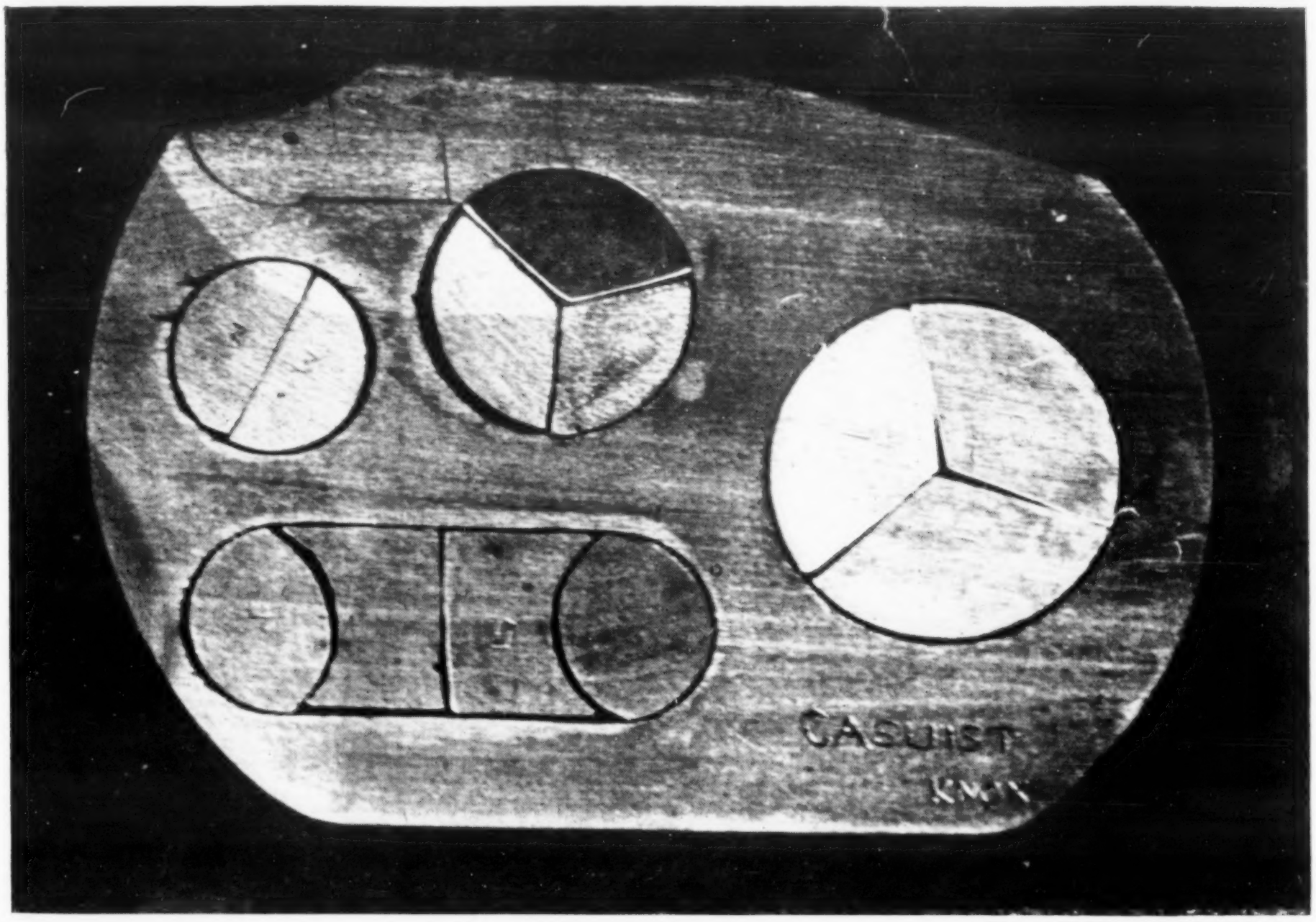
(9) Inability to withstand temptation. The baser qualities of the subconscious mind cannot be inhibited and dishonesty and other crime is the frequent result.

(10) Early brain fag and absence of the power of sustained energy. Such people are incapable of consistent efficient work for any great length of time. They are easily discontented and discouraged with each new position they obtain.

NOMENCLATURE VAGUE.

By this it is not meant that all defectives are possessed of all the above mentioned characteristics but it is true that every defective who is certified by the United States Public Health Service is possessed of a certain group of them and perhaps in some cases all of them. These ten are not all the peculiarities by which defectives in general are distinguished, but the elements and mental spheres enumerated here will serve to give a clear idea of what constitutes mental enfeeblement in the aliens who are presented for examination. Fortunately the term "feeble-mindedness" is regarded by most alienists as a sort of waste basket for many forms and degrees of weakmindedness, and since it is incorporated in the law as a mandatorially excludable defect, it is especially suited to the needs of the examiners who for the sake of conservatism and certain fairness include many imbeciles under the term.

The commoner characteristics of defectives have been given above. Know-



THE "CASUIST" TEST.

Properly to fit into their places the blocks of this frame requires the intelligence of a normal 12-year-old child. He should be able to do it in five minutes, or less, without making any mistakes that are not reasonable. At an older age, he should be able to do it in correspondingly less time. (Figure 14.)

ing the signs and manifestations, how may they best be elucidated and brought out in order to make a proper diagnosis and certificate? This is probably best accomplished by a graduated system of performance tests, accurately standardized, and a system of test questions of increasing complexity suited to the age, education and previous environment of the subject. The examining physicians are guided first of all by plain common sense, enthusiasm and personal feelings never entering into the consideration of any case. It is well for the sake of justice to the country and to the immigrant that this is so. The functions of the officers of the Public Health Service are purely advisory and not legal. Their duty is done when the proper certificate has been rendered; the people should not hold them responsible therefore if defectives are often admitted notwithstanding adverse certificates.

This is as important perhaps in the case of the insane as in the case of defectives and it is probably true that a great number of alien insane would not have become so had they not come to America. Such people are not fitted to become citizens of this country, although they may get along very well at home.

MANY INSANE CONCEALED.

It is probably true that the number of alien insane in the country is much larger than is generally supposed; in other words there are alien insane who never find their way to hospitals, their relatives knowing that if they do they are liable to be deported. Only the very dangerous and noisy insane reach the public institutions. The simple neuroses and milder forms of insanity remain at home in the care of their countrymen and friends, who, because of race pride or for other reasons do not wish the amount of insanity and disease they harbor to become known.

The dull, stupid immigrant is not so entirely because of his previous environment and opportunities. The environment and opportunities are the same now as they have been for countless centuries because of the immigrant's inability to change them. This country is as it is simply because it has been improved by men from prosperous northern European countries, which countries were prosperous simply because of the type of men who inhabited them. The civilization in Mexico is in its present state because of the nature of the people who settled there. It must be remembered that the form of government is the same there as in our own land and the natural resources are even greater. These factors are not to be blamed for the pitiable condition of the class of people that are coming to our shores at this time. They are simply undesirables and can never be assimilated to our advantage.

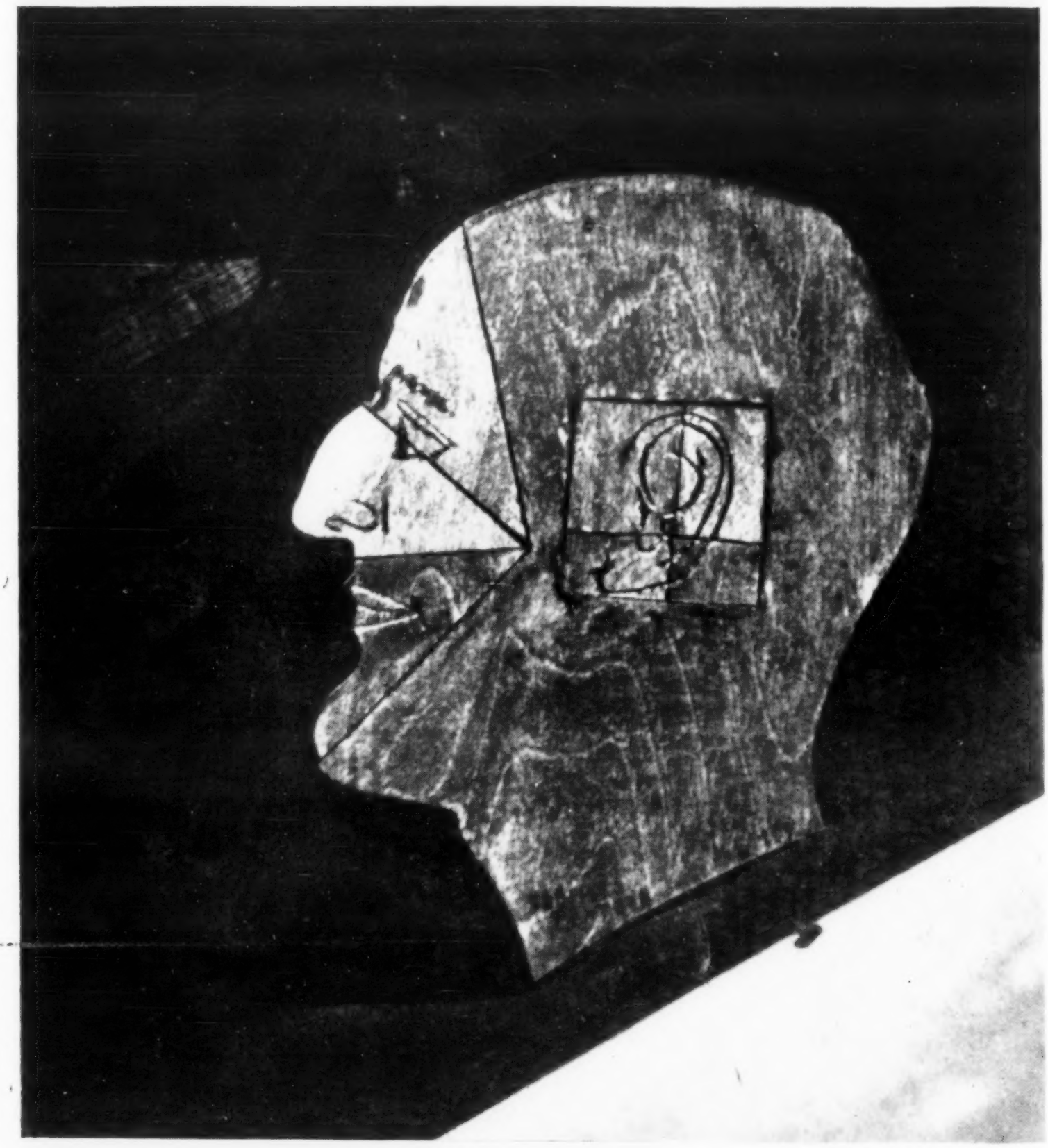
In a paper of this kind it is impossible to detail all the principles that underlie the deficiency tests used by the Public Health Service, nevertheless an outline can be given in such a way that one will understand the rationale of the examination and just what factors each test tends to bring forth.

In the higher and more refined grades of deficiency, the most important element in the diagnosis is the "human test" or the ability of one human being to take the mental measurement of another by conversing and associating with him. This intuitive ability can be very highly developed in persons of a strong and pleasing personality and good physique. It must be based on the experience of having seen and examined many positive and also normal cases and the examiner must be a broad-minded, big-souled man keenly alive to the frailties and shortcomings of the human race in general, including himself.

SOME DEFINITE SIGNS.

At the various ages in the lives of the simple minded there are definite signs that may be observed and which should aid one in forming a correct conclusion. Those seen in infancy are the ones least commonly known. They are seen in infants who are excitable or unusually quiet and apathetic. The eyes may roll about in an aimless stare. The child may be slow in learning to sit up, to walk or to use its hands. It may be slow to recognize objects and it may not respond to the caresses of its parents. It may be restless and irritable (exclusive of illness) and refuse to be pacified. It may sleep long and fitfully and there may be twitching of the face or limbs during sleep as well as bed wetting (in older children) and drooling both when asleep and awake. This drooling and failure to grasp the nipple properly are due to lack of muscular tone, protrusion of the lower jaw (prognathism), faulty reflexes, and too much blood (hyperaemia) in the salivary glands. These signs with clumsy use of the muscles are very frequently seen in infant defectives. The lower the grade of deficiency the greater the number and more marked are the signs presented. There may be in addition developmental digestive errors, vomiting without apparent cause, diarrhoea, poor hearing and delayed speech. It should be remembered that normal children are active, buoyant and playful while defectives may be possessed of a general inertia, sullenness and apathy that is altogether unnatural in that period of life. The child may be flighty and changeable, frequently indulging in silly laughter and chatter. The features lack individuality. The head may be malformed. The mouth may be coarse and expressionless and the teeth decayed and irregular. The breath and secretions may have a foul odor.

These are some of the obvious signs that would cause a child to be detained and submitted to a more detailed examination. Suffice it to say that the signs observed in older defectives are more numerous and perhaps more definite. It is true, however, that defectives are detected nearly every day who possess but few or no outward signs at all. This variety of inferior is detected solely by talking with him, and something is said to every immigrant who passes through Ellis Island or any other port of entry. At the primary line-inspec-



THE MOST DIFFICULT TEST.

The "feature-profile" test requires a degree of intelligence rarely found in the feeble-minded: a 12-year-old child or an adult with corresponding mentality may be expected to put it together in five minutes or less. The profile head is made of wood, half an inch thick, and its greatest measurements are six by ten inches. There are seven pieces exclusive of the main one, the eye, nose and mouth each comprising one, while the ear is made up of four sections which can only be fitted together in one way. Successfully to pass this test shows that the subject possesses ability to read a diagram; however, it is an entirely fair test, because the object is familiar to everyone. (Figure 15.)

tion questions are asked on the following subjects: the journey, experience during the trip, simple concrete addition and the ability to count backwards, facts of common knowledge that the immigrant should know and his grasp of his surroundings. This examination must be brief, rapid and to the point because from three to five thousand people must be questioned in this way each day. Those who do not answer satisfactorily are detained for a more detailed examination a few minutes later and if at this time their answers are more nearly correct they are allowed to go, otherwise they are detained for a third or even a fourth or fifth examination on other days and if at this time they are found to be defective they are so certified and deported, otherwise they are allowed to depart.

THE FINAL EXAMINATION.

The final examination will now be outlined in the order that its respective items are given to illiterate immigrants

over ten years old, it being modified for younger ones:

1. Select a quiet, well lighted and ventilated room, with a temperature of not over 68 degrees Fahrenheit. There must be no disturbing or distracting elements and the room must not have an official air, in fact it should look as much like a "den" in a private house as possible. Only those concerned in the examination should be present, that is, the interpreter and the examiners and in the case of children or timid people, a relative. The subject must have had good food and a bath previously and he must be mentally as tranquil as possible. The in erpreter should be kindly disposed towards the alien and understand him thoroughly and be understood by him. First question the subject about the ordinary occurrences and every-day duties of his previous environment. If he claims to have been a farmer ask about that vocation, if a tailor ask about that, framing the questions to the calling and previous style of living. Further than this ask about conditions as they exist in the town or locality from which the alien came.

2. Does he know the day of the week, the date, the month of the year, where he is, who he is, and who and what the examiner is? This set of questions determines his orientation and grasp on his surroundings.

3. Common knowledge comes next; the number of hours in a day, days in a week, weeks in a month, months in a year with their names, the difference between certain animals with which he is familiar, the names of flowers, musical instruments, etc., with which he is familiar, and brief descriptions of each.

4. Immigrants should be able to do simple addition although they have never attended school and all normal immigrants over eight years old can do it. After adding like numbers, they should be able to add unlike numbers, when one of the previously used like numbers is increased or decreased by 1, for instance, 4 and 4=, 4 and 5=, 4 and 3=, 6 and 6=, 6 and 5=, 6 and 7=, or 8 and 8=, 8 and 7=; rapidly and without difficulty. They should be able to add the following numbers rapidly, realizing in each case that each succeeding problem is but 1 greater than was the previous one; 7 and 1=, 7 and 2=, 7 and 3=, 7 and 4=, 7 and 5=, 7 and 6=, 7 and 7=, 7 and 8=, etc. The vast majority of defectives excepting mathematical savants will go through a most laborious mental process in attempting to do this latter set of problems only to emerge with a most absurd answer, for instance, they may give the answer to 7 and 2 as more than the sum of 7 and 8.

MORAL TONE TESTED.

5. Ask questions which tend to show the moral tone as "Why is it wrong to kill?" and "How should one regard his parents as compared to other people?" and "Is it wrong to steal?" and if so, "Why?" Determine whether he would try to resist temptation, how he would meet evil suggestions and other questionable things. Some most astonishing answers have been obtained to these questions as in the case of a boy who, while he professed a love for his parents, wished them dead that he might inherit their property; he was 17 years old and was found defective by the other tests.

6. Construct as nearly as possible miniature problems and incidents of life as the alien has lived it in his country and ask what he would do in each position.

7. If he can count from 1 to 20, as all normal aliens usually can, he should be able to count from 20 to 1 without hesitation; he should have no difficulty in naming the days of the week backward.

8. He should be able to repeat six, or at least five, figures after the examiner, as 2-9-8-7-5-6-4, or 5-2-9-7-3. The figures should be given slowly and distinctly, not repeating each set more than twice.

9. The subject should be able to obey three or more simple commands as "open the door, bring me that book, and put this penny on the table."

10. After looking at a picture for thirty seconds, the picture containing 12 objects with which he is familiar, he should be able to name six of them from memory, without much hesitation.

11. A diamond or a square should be copied with a lead pencil even though he has never attempted this before.

12. The alien should be able to arrange in the order of their weights four cubes of the same size, weighing respectively 12, 15, 18, and 21 gms.

At this point comes the performing test examination. Just as Binet has evolved questions of increasing complexity for his French school children, so the United States Public Health Service has evolved a set of performance tests of increasing complexity. These are applicable to every age from three years upward and the point in the scale where an adult stops determines his mental age and the grade of defectives under which he will be classified. At the following ages the tests named under each should be performed within the time limit stated.

THE PERFORMANCE TESTS.[1]

At three years—

Should recognize toys and simple objects as such.

At four years—

Put some of the pieces in Sequin's formboard and do line "a" of the cube imitation test or touch any two of the blocks.

At five years—

Put all the pieces in Sequin's formboard in three minutes and do line "b" of the cube test or touch any three of its blocks.

At six years—

Do the "imbecile" test in five minutes with not over six false moves. Line "c" of the cube test is easy for normals at this age. The construction blocks may be started now; take three blocks all the same shape and build a figure with them, show this to the subject for twenty-five seconds, then break up the structure and ask him to build the same thing. (See Fig. 12.)

At seven years—

Do "G" or jigsaw test in three to five minutes, Sequin formboard in thirty seconds and "imbecile" test in less time and with fewer false moves than at six years. Add one block to construction blocks.

At eight years—

Do Healy frame test in five minutes and imitate line "d" of the cube test.

At nine years—

Do diamond frame test, in from five to ten minutes; Healy picture in less than four minutes, Seguin board in twenty seconds and complexity of construction blocks may be increased to work with five blocks.

At ten years—

Do "moron" test in less than ten minutes and all the details of the "visual comparison" test (see N. Y. Med. Jour., Sept. 13, '13) inside of ten minutes.

At eleven years—

Do the "e" line of the cube test without being shown more than five times. The eight, nine and ten year tests are performed in less time and with fewer mistakes.

At twelve years—

Do the "casuist" test in five minutes and any mistakes that are made must be "sensible" and not absurd. (Fig. 14.)

At thirteen to fifteen years—

Do "casuist" test in less time and with fewer mistakes than at 12 years; it should be done without first being shown made up or assembled. The "feature-profile" test should be correctly done in five minutes. The picture of a ship pasted to a board and cut into ten equal sized pieces of the same shape should be properly assembled in ten minutes. The pieces are all cut vertically. (Fig. 15.)

This concludes the performance tests after which a story is told the subject; the story contains five details and he is expected to remember three of them. A second story is told which contains an obvious absurdity; if the alien sees this absurdity it counts in his favor but if he does not, that fact does not count against him.

It is very evident that at the conclusion of this examination the physician is in a good position to give his subject a mental rating, provided of course that he tempers the tests with plenty of every day common sense.

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[1] Dr. Knox is about to publish a more complete account of the special scale for the measurement of intelligence, classification of defectives, and performance tests, with report of cases, in the *Journal of the American Medical Association*. He will be glad to send interested members of the American Genetic Association the exact reference, or a reprint of the more extended discussion of the subject. The illustrations of performance tests published herewith illustrate the general character of all, but are, of course, only a few of the whole number used.—*The Editor*.

PLANTING PERSIMMONS

Japanese Variety Requires Pollinizers Under Most Conditions—Few Satisfactory Pollinizers yet found—Native Persimmon Can Not be Used, Because of its Incompatibility.

H. HAROLD HUME,
Glen Saint Mary, Florida.

EVER since *Diospyros Kaki* (commonly called the Japanese persimmon) was introduced and established in America about 1875, it has been noted in many sections that though the trees produce enough flowers to give good crops of fruit, the young fruits or ovaries of many varieties begin to drop shortly after the flowers open, and continue to drop, until, when the harvest season arrives, no fruit remains to be gathered, or so little that the planter is often disgusted with their behavior. In some seasons good crops are produced under conditions quite identical with those which prevailed in seasons when no crop was produced. The cause of this unfruitfulness and this sporadic fruitfulness remained very much of a mystery for many years. Naturally the cultivation of *D. Kaki* is not regarded favorably by many who have attempted it.

As is usual in such cases, many theories have been advanced to account for its non-fruiting. Some said that the trouble was due to too much cultivation, and that a system of weed or sod cultivation would correct it. Others said it was due to lack of potash in the fertilizer and that heavy applications of potash would correct the trouble. Still others said that the growth and development of the calyces forced the ovaries off, and so on. One theory after another was put to test, but regardless of theories and their application, the Japanese persimmon (*Diospyros Kaki*) has continued to act in the same manner—producing flowers abundantly, sometimes resulting in fruit, more often giving no harvest.

WHY FRUIT FAILS TO SET.

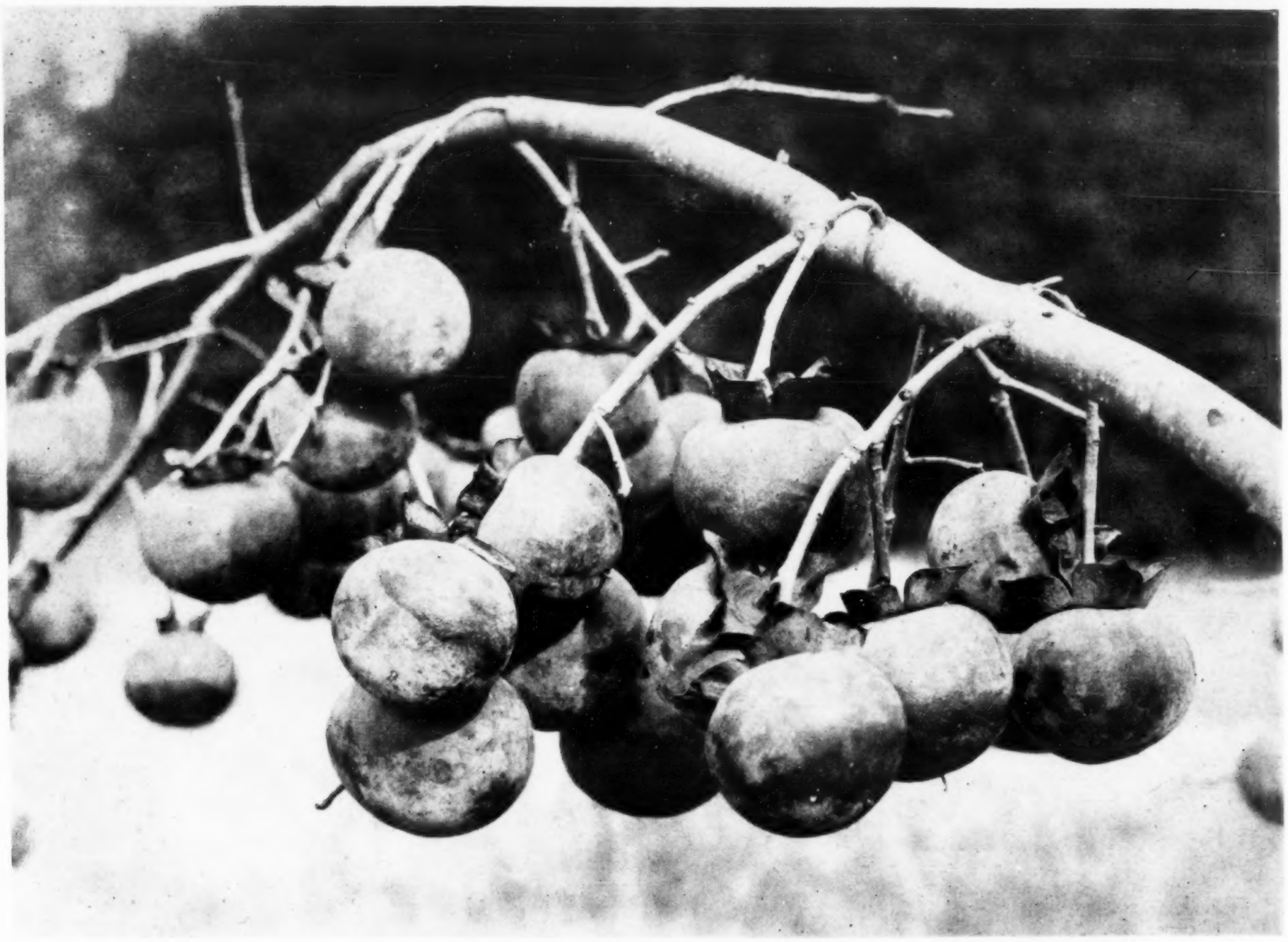
It was not until 1909 that attention was called to the true cause of barrenness[1] in *D. Kaki* and the year following, the cause of sporadic fruitfulness was learned. It was known years before to a few[2] that the flowers of *D. Kaki* are of two kinds, pistillate and staminate, but that this fact had any practical bearing on the problem of unfruitfulness did not seem to occur to anyone. More recently[3] the existence of perfect flowers, i.e., those containing both stamens and pistils, was brought to light. These flowers have no practical bearing on the problem, as they are rare and, from some cause or other not yet clearly understood, their ovaries very seldom develop into mature fruit. Since 1909, the results of more than twenty thousand hand pollinations have fairly demonstrated that pollination will cause fruit to set and grow to maturity, when without it, no fruit would be produced.

The fruitfulness of certain trees or groups of trees in some seasons and not in others even when pistillate flowers

[1]Hume, H. Harold. Non-fruiting of Japan Persimmons due to lack of Pollen. Science, N. S. Vol. XXX No. 76. Sept. 3. 308–309. 1909.

[2]Berckmans, P. J. Persimmons. Cyclopedia American Horticulture, 3. 1281. 1901; also Van Deman, H. E. The Kaki. Report of the Commissioner of Agriculture, 1887. 642–645. 1888.

[3]Hume, H. Harold. The flowers of Diospryos Kaki L. F. Trans. Acad. Science St. Louis Vol. XXII. No. 5. Dec. 31. 125–135. Pl. XXV–XXXI. 1913.



FRUITING BRANCH OF SIANG.

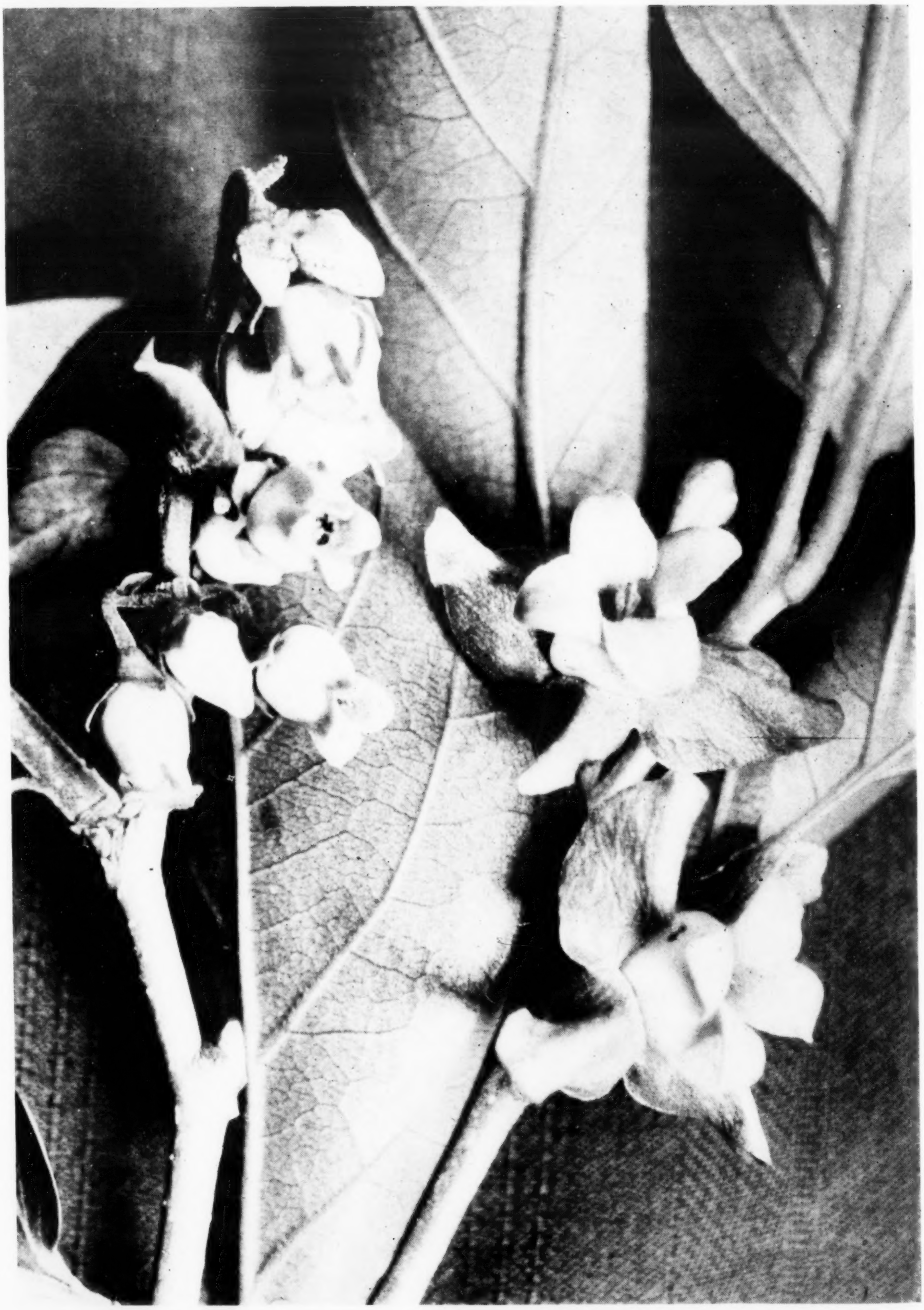
This variety (S. P. I. No. 21910) produces flowers of both sexes, and the persimmons here shown are from pistillate flowers pollinated from staminate blossoms on the same tree. So heavily fruited was the whole tree, that the fruit would have been much improved by thinning. (Figure 16.)

were present in goodly numbers each season can now be explained by the fact that there are certain horticultural varieties of *D. Kaki* which produce staminate flowers at irregular intervals. They may be found on certain trees one season and not the next. Many seasons may elapse before they appear again. It may even happen that never again are they produced, or they may be produced every other season. Many combinations of intervals or skips in the production of staminate flowers are possible and probable. A number of them have been observed and noted with reference to particular trees. The staminate flowers, when they occur on these trees, are abundantly supplied with pollen and fertilize not only the pistillate flowers on the same trees, but through the agency of insects the flowers of many trees surrounding them.

Careful examination of many hundreds of blossoms of the pistillate type showed that the stamens of these flowers are always abortive, and no pollen is produced in them. It was also learned that the flowers which contain pollen-bearing stamens are always different in structure from these pistillate flowers, so different indeed as to be readily distinguished from them.

THE SEARCH FOR POLLINIZERS.

Having then arrived at the large general cause of the unfruitfulness of *D. Kaki* and having determined that pollination would cause the trees to hold their fruit, our difficulty was to find dependable staminate flowering sorts. So far as any one in America knew, these did not exist, but it was believed that there were such trees. By accident one tree of unknown name and origin was found near Eagle Lake, Florida. It is dependable. One other



FLOWERS OF THE GAILEY TREE.

This Japanese Persimmon tree has been under observation since 1909, and each year has produced a very large percentage of staminate (male) flowers of the type shown at the right, wide open. The normal, pistillate (female) flowers are seen at the left, wide open. All trees propagated from this parent have likewise borne staminate flowers, and it may therefore be considered the most reliable pollen producer which has yet been developed in the United States. (Figure 17.)

from San Antonio, Texas, is promising and a third, a seedling at Glen Saint Mary, Florida, is known to have produced staminate flowers each season for three years. Through the efforts of David Fairchild, whose hearty interest and co-operation in the work has been of the greatest help, a number of other promising sorts have been secured from China and Japan. In a few seasons more, it will be known whether these sorts can be depended upon to produce staminate flowers abundantly every time they bloom.

Now, the question is not, "How does *Kaki* behave in Japan or China? And are pollinizers necessary there?" But the question is, "How does it act in the United States?" and to narrow it down still further, "Is it fruitful in Florida, or Georgia, or California?" Yes, and still more, "How does it behave in a certain county, on a certain farm, or in a certain dooryard?" And the answer must be that while in some localities pollinizers may not be necessary, under other conditions the planting of them is an absolute necessity, making, as it does, the difference between success and failure in securing crops of fruit; and in all cases the presence of pollinizers is an insurance against unfruitfulness.

BEHAVIOR VARIABLE.

It must be emphasized that the behavior of *D. Kaki* in its relation to pollination, or of any other fruit for the matter of that, in any one locality, is no index to its behavior under any other set of conditions. Even though the conditions may appear to be the same, there are differences which we are too dull to detect or too ignorant to understand, but which nevertheless operate on the trees and influence the results. It is a matter of observation that under certain local seasonal and climatic conditions some varieties of *D. Kaki* will set good crops of fruit without pollination (seedless of course) while under another set of conditions they do not do so. One season they may bloom freely and set all the fruit the trees should carry and with an equal amount of bloom in another season the same trees may bring no fruit to maturity. To sum up the conditions as they are at present in the Lower South, and based on numerous observations extending over more than a decade, it is a fact that trees of all varieties of *D. Kaki*, in good health and which bloom under normal weather conditions, can be depended upon to bear good crops if pollinated, and it is equally true (a few varieties only excepted) that they will not do so if pollen is not provided. In the last two seasons it has been amply demonstrated that all that is necessary is to have staminate flowering trees in proximity to the pistillate ones and bees, wasps, flies and other insects will take care of the problem according to nature's own plan.

POLLINATION NOT A CURE ALL.

It must not be concluded, however, from these remarks that pollen bearing trees in a Japanese persimmon orchard are a cure for each and every case of unfruitfulness. There are other factors which enter into the problem of barrenness. The trees may not bear fruit because they are unhealthy—they may be poorly nourished or they may be suffering from attacks of insects, (the flat headed borer, *Dicera obscura*, in particular) or fungi or bacteria. Again the trees may not even bloom, and the forces which make for flower production, intimately bound up as they are with environmental pressure on the activities of the protoplasm, are not well understood. But if the trees are in good condition, not starved on the one hand, and not forced into too vigorous and succulent growth on the other, they can usually be depended upon to bloom. Even though the trees may bloom profusely and both staminate and pistillate flowers are present in the orchard, the activity of insects, upon which pollination depends, may be greatly restricted or completely suppressed by untoward weather conditions. High winds and heavy rains combined make a condition particularly unfavorable for successful and satisfactory pollination, both because the flowers or their essential parts may be injured and because the insect pollen carriers cannot work.

Neither must it be expected that

FRUIT OF TAMOPAN VARIETY, ACTUAL SIZE.

This is one of the most valuable varieties in China, where it is practically seedless. It is propagated on a large scale by native horticulturists and sold more commonly than any other in some of the most important markets. In the United States it seems never to produce any staminate flowers, but, on the other hand, it seems not to require pollination for successful fruiting. It has not been widely enough tested to determine its behavior with certainty. (Figure 18.)

every pistillate flower on *D. Kaki* trees will set fruit even though there is an abundance of pollen nearby. Pistillate flowers are produced singly in the leaf axils near the base of the twigs of the current season's growth. There may be anywhere from two or three to eight or ten flowers in the lower nodes of a new shoot, and if every one of these flowers produced fruit, the trees would be very much overloaded. Fortunately this does not occur, however, and trees which are heavily fruited do not set more than one fruit for every six or eight flowers on an average. In very much overloaded trees, the number sometimes runs as high as one in three or four. This percentage is too great in some cases and it would be better to remove a considerable portion of the fruit to increase the size and quality of that which is allowed to remain. The percentage of flowers which produce fruit under proper conditions is higher than

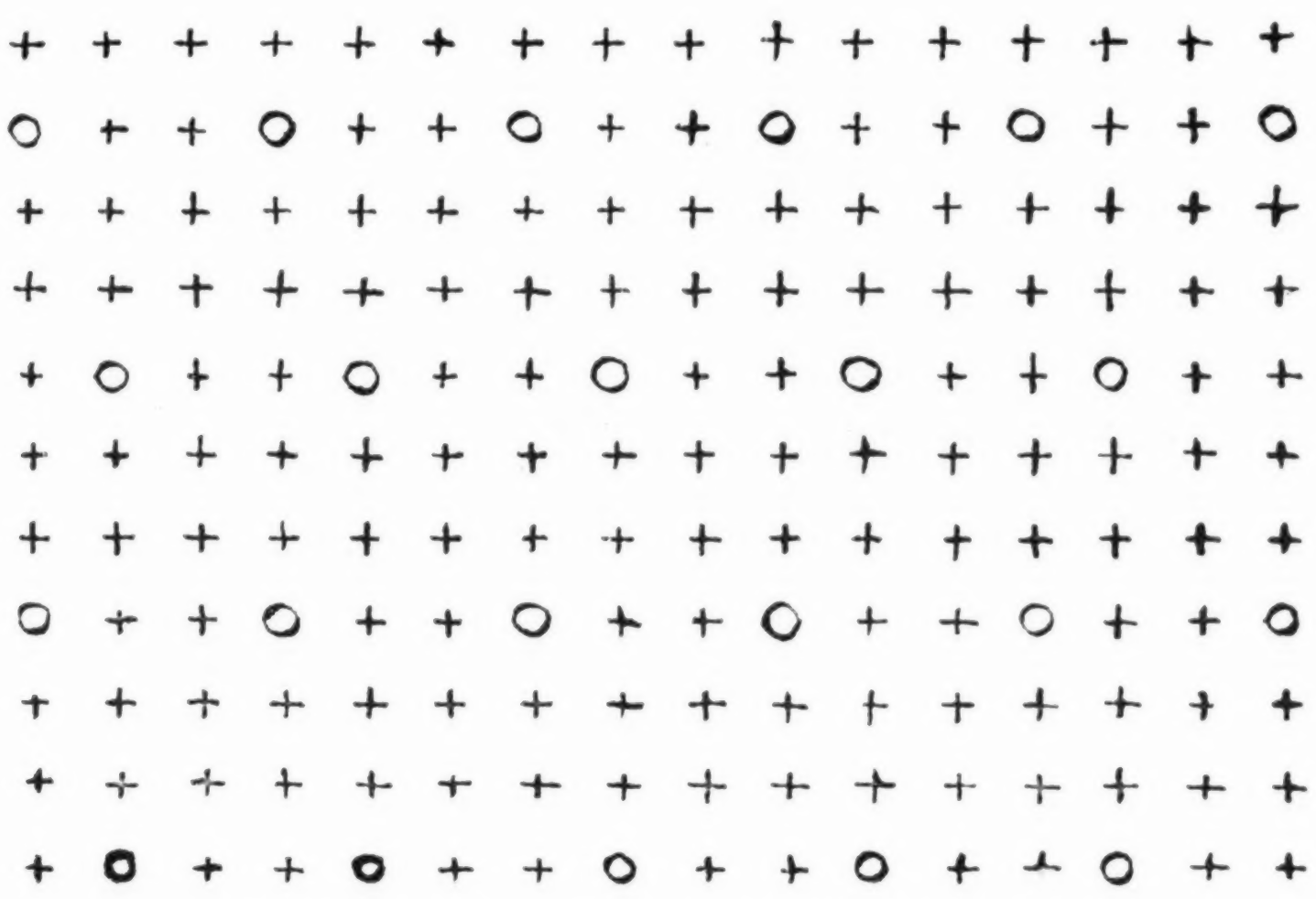
on other fruit trees, where the flowers are borne in clusters, as is the case with apples, pears and plums.

NO HELP FROM D. VIRGINIANA.

In a very large part of the area in which *D. Kaki* may be grown, the common American persimmon, *D. Virginiana*, is native and very naturally the question may be asked, will not staminate trees of this species serve as pollinizers? This the writer thought possible a few year ago. The evidence at hand so far proves that they are entirely worthless for this purpose and the proximity of staminate *D. Virginiana* trees has no influence whatever on the fruitfulness of *D. Kaki*. Moreover out of many hundred hand pollinations between *D. Kaki* and *D. Virginiana* using both species as the male parent no viable seed has so far been secured. They appear to be absolutely incompatible. It may be pointed out in passing that evidence is accumulating which shows that the presence of staminate *D. Virginiana* trees is essential to the fruitfulness of pistillate trees of the same species in some localities. The necessity of pollinizers for *D. Virginiana* has been denied by some writers.

It follows therefore that to make fruitfulness certain it is a wise plan in all localities to include *D. Kaki* pollinizers in the planting, and with most horticultural varieties of *D. Kaki*, in most sections, it is a provision of fundamental necessity. What varieties can be used as pollinizers?

Quite a number of varieties of *D. Kaki* are known to produce staminate flowers. The list now known in this country comprises Okame, Taber's No. 23, Taber's No. 129, Gailey, Masugata, Siang (S. P. I. No. 21910) New Sien (S. P. I. No. 22368) and S. P. I. No. 27037. All of these have produced staminate in addition to the pistillate flowers, and occasionally perfect flowers (i.e., those containing both stamens and pistils) have been found.



PLANTING PLAN FOR JAPANESE PERSIMMONS.

In order that there may be pollinizers wherever wanted, but not elsewhere, Mr. Hume recommends setting them in the positions indicated by small circles in the above diagram, the crosses indicating ordinary female trees. (Figure 19.)

Thus far the most painstaking and careful examination of many hundreds of trees, when in bloom, has failed to reveal the presence of staminate flowers on varieties Costata, Hachiya, Hyakume, Tsuru, Tamopan, Tanenashi, Zengi, Triumph, Yemon, Yeddoichi and

Phelps. Under some conditions some of these same varieties may produce them.

CONFUSION IN NAMES.

It must be remembered, too, that there is much confusion in the names of varieties of *D. Kaki* dating back to the time of their introduction into America. The older varieties mentioned have been under observation for many years and are believed to be correctly named. Particular reference must be made to Tanenashi, a normally seedless variety which fruits well without pollination. It is very difficult to secure seed in its fruits from the most careful hand pollinations. It would be a drawback to have pollinizers near this variety if the pollen from them caused seed development. Fortunately pollination has practically no effect on it in this particular. The ovules have so far proved to be largely sterile. There is some evidence to prove that Tamopan is very similar to Tanenashi in its behavior toward pollination.

Unfortunately very few of the varieties which have produced staminate flowers can be depended upon as pollinizers. Okame, Taber's No. 23 and Taber's No. 129, for instance, produce staminate flowers one year and not the next, though pistillate flowers are borne each season. Of these three Taber's No. 129 is the most constant in its behavior. Gailey (as the tree found near Eagle Lake has been named) is known to be a *constantly staminate* variety, i.e., it produces a good percentage of staminate flowers every time it blooms. The other varieties mentioned cannot be placed at this time as they have not been under observation long enough. The lists will doubtless be largely increased within the next few years as the behavior of new introductions becomes known. Seedlings are also being raised and doubtless they will add to the number.

Hence the only variety which can be recommended at this time, as a pollinizer, is Gailey. This variety has a long flowering season, and the flowers are abundantly supplied with pollen. The fruit, however, is quite small, and consequently not so valuable as the larger sorts with which it would be planted.

PLANTING PLANS.

For this reason, and for another reason which will be touched upon later, the number of Gailey pollinizers in the orchard should be reduced to a minimum, having in mind at the same time that enough trees should be set to produce the pollen necessary to insure good crops of fruit. While it is a recognized fact that pollinizers are necessary in plantings of other kinds of fruits such as apples and pears, for instance, it is also a fact that specific recommendations as to the number of pollinizers required and their location in orchards of these kinds have seldom been made by writers on this subject.

The full complement of seeds (eight) is objectionable in fruit of *D. Kaki*, particularly in the smaller varieties. If one seed develops in a fruit, its development appears to be quite as efficient in causing fruit to hold as if the full number is formed. It has been observed, moreover, that as the distance of a tree from the pollinizers increases, the average number of seeds in the fruit decreases. Therefore to reduce the number of seeds in the fruit to a miminum, the number of pollinizers should be reduced to the very least number which will provide for effective fruit setting. This problem has not yet been worked out absolutely and additional time will be required to decide it definitely.

Plantings made this winter have been made according to the accompanying diagram. It will be noted that the pollinizers are placed every third tree in every third row, in such a way that the spaces in the pollination rows are broken. The proportion is one to seven or eight. In large plantings by this plan, each tree requiring pollination has a pollinizer, directly adjoining it on one side. It may be that a lesser number will in the end prove satisfactory, but there is no doubt but that this plan will insure sufficient pollination for even the most pronounced sterile varieties such as Hachiya and Yemon.

TOP-WORKING.

What is the owner of an orchard already planted to do if he desires to place pollinizers in his orchard? It is quite easy to bud over branches here and there in properly placed trees. No preliminary cutting back is necessary as the buds may be inserted where the bark is anywhere from one to three years old. The work should be done just as the leaves are coming out in spring, using the ordinary method of shield budding and tying the buds in place with waxed cloth. The wraps should be left on about three weeks and as soon as the buds have taken, the branches should be cut back, leaving stubs five or six inches long to which the shoots from the buds may be tied as they grow out. These stubs should be removed at the end of one season's growth.

ITALIANS TAKE UP EUGENICS

On November 17th, the Roman Society of Anthropology organized an "Italian Committee" for the study of eugenics. The Directors are:

Prof. Giuseppe Sergi, *President.*
Prof. Sante de Sanctis, *Vice-President.*
Dr. Cesare Artom, *Counsellor.*
Prof. Corrado Gini, *Counsellor.*
Prof. Mangiagali, *Counsellor.*
Prof. Alfredo Niceforo, *Counsellor.*
Dr. F. Umberto Saffiotti, *Secretary.*

INTERNATIONAL EUGENICS CONGRESS

The Organizing Committee of the Second International Eugenics Congress met in New York City, January 2,1914 and elected Professor Alexander Graham Bell Honorary President and Professor Henry Fairfield Osborn, President. The nucleus of a General Committee was also named. Professor Osborn has accepted the Presidency. It is probable that the Congress will hold its meetings in the latter half of September, 1915, at the American Museum of Natural History, New York City.

A. B. A. PUBLICATIONS WANTED

On the inside back cover of this issue will be found a list of the American Breeders Association annual reports, and back numbers of the American Breeders' Magazine, which the association still has for sale. There is a constant demand for the other numbers and reports, particularly from libraries which wish to complete files. Those who have any copies of the annual reports, or of the magazine, other than are enumerated on the inside back cover, will confer a favor by notifying the secretary, if they are willing to sell them.